

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED: December 26, 1963

RELEASED: January 2, 1964

THE FLYING TIGER LINE INC.,
LOCKHEED 1049H, N 6913C, NORTH HOLLYWOOD, CALIFORNIA
DECEMBER 14, 1962

SYNOPSIS

On December 14, 1962, at 2212 P.s.t., a Flying Tiger Line Inc., Super Constellation, N 6913C, crashed about 1-1/4 miles west of the Lockheed Air Terminal, Burbank, California, during an ILS approach to runway 7. All five persons on board the aircraft and three persons on the ground sustained fatal injuries.

The last radio communication with N 6913C was the flight's acknowledgment of its radar-observed position two miles from the end of the runway on the localizer course. Twenty seconds later the aircraft crashed into a fog-shrouded residential/industrial area.

The Board has determined that the probable cause of this accident was the incapacitation of the pilot-in-command, at a critical point in the approach, resulting in a loss of control of the aircraft from which the copilot was unable to recover.

Investigation

The Flying Tiger Line (FTL) Cargo Flight 183/13/13C,^{1/} a Lockheed Super Constellation L-1049H, N 6913C, crashed and burned approximately 1-1/4 miles west of the Lockheed Air Terminal, Burbank, California, at 2212:15^{2/} on December 14, 1962. The accident occurred during an Instrument Landing System (ILS) approach to runway 7 at Burbank. All five occupants of the aircraft, three crew members, and two non-revenue passengers, received fatal injuries. Three persons on the ground were also fatally injured. The aircraft was destroyed by impact and fire.

Flight 183 originated in Boston, Massachusetts, on December 13, 1962, with stops scheduled at Windsor Locks, Connecticut, Chicago, Illinois, and was to terminate at Burbank, California. It proceeded uneventfully to Chicago - O'Hare International Airport, where a scheduled crew change was effected. Captain Karl C. Rader, First Officer David L. Crapo, and Flight Engineer Jack W. Grey assumed the flight crew duties for the remainder of the trip to Burbank. Two non-revenue passengers also boarded at Chicago. No aircraft maintenance had been required at Boston or Windsor Locks and the only reported maintenance discrepancy was corrected by replacement of the No. 3 integral fuel dip stick seal at Chicago.

^{1/} Also referred to as Flight 183 or N 6913C; and in radio communications as "Tiger - 913" or "913 - Charlie."

^{2/} All times herein are Pacific standard based on the 24-hour clock.

During the ground time at O'Hare, N 6913C was serviced to a total of 27,060 pounds of fuel and 41,038 pounds of cargo was loaded and tied down securely. The takeoff gross weight was computed to be 139,946 pounds. This weight and the center of gravity (c.g.) were both within prescribed limits. First Officer Crapo was observed to be occupying the left (pilot) seat and Captain Rader the right (copilot) seat prior to departure from the ramp.

The Burbank terminal weather forecast, valid from 1500 - 2300, furnished the crew at Chicago indicated: clear sky, visibility five miles, haze and smoke. The weather after 2300 was forecast to become: partial obscuration, visibility 1-1/2 miles, haze and smoke.

The aircraft departed O'Hare Airport at 1508 after receiving an Instrument Flight Rules (IFR) clearance to the Burbank Airport via Naperville, Victor Airways to Palmdale, direct Twin Lakes, direct Burbank, to maintain 4,000 feet. Subsequent clearances authorized flight at 10,000, then 16,000 feet. The flight plan indicated an estimated time en route of seven hours with Palmdale, California, designated as the alternate airport.

The flight proceeded normally to the Los Angeles area and at 2126 received the following weather advisory from the Los Angeles Air Route Traffic Control Center: 2126 Burbank weather: ". . . measured ceiling two hundred overcast, one-half mile fog and smoke, ILS runway visibility zero." The flight then requested the Los Angeles weather. The 2100 Los Angeles weather was provided as follows: ". . . measured six hundred scattered, measured one thousand overcast, visibility six miles with haze and smoke." The crew acknowledged this transmission and advised the Center that they would continue on to Burbank and if the airport was closed when they arrived the flight would proceed to Los Angeles and land.

At 2149, when approximately 10 minutes northeast of Palmdale, the flight contacted the Los Angeles station of Aeronautical Radio, Inc.,^{3/} (ARINC) and requested they advise the company (FTL) that existing weather conditions at Burbank were below minimums and that the flight was proceeding to Los Angeles International Airport for landing. After reporting over the Palmdale VOR at 11,000 feet at 2159:33, the flight received a special Burbank weather observation from the Center which stated ". . . sky partially obscured, five hundred overcast, one-half mile visibility with fog." N 6913C acknowledged this transmission by reading back the message, then stated that they would like to make an approach at Burbank. Shortly thereafter (2205), when in the vicinity of the Lang intersection, the flight was contacted by ARINC and provided with the 2200 Burbank weather ". . . partial obscuration, estimated five hundred overcast, one mile fog and smoke, temperature five two, dewpoint five one, wind north one, altimeter thirty fifteen, runway zero seven visual range one and three quarters miles, fog, eight tenths, tower visibility one half mile." Flight 183 acknowledged this transmission and stated ". . . we're going to shoot an approach at Burbank and then if we miss we'll go on over to LA. . . ." The applicable ILS approach minimums at Burbank were 300 feet ceiling and 3/4 mile visibility. Sliding scale^{4/} is not applicable to these minimums.

The flight was cleared to descend to 8,000 feet, and at 2205 control was transferred from the Center to Burbank Approach Control. During the radar handoff the

^{3/} The contract operator of the company's aeronautical radio service.

^{4/} An FAA authorized decrease in visibility minimums when accompanied by an increase in ceiling height above published minimums.

aircraft was identified three miles east of the Lang intersection. Normal radar vectoring services^{5/} were provided by Approach Control, and subsequently the flight requested to be vectored close in for its ILS approach. The flight continued its descent in visual flight conditions, as reported by the pilot, to 3,500 feet on headings of 145 and 090 degrees and a turn-on to the ILS localizer course of 076 degrees was commenced at a point 1-1/2 miles northwest of the ILS outer marker. At 2210, the approach controller advised Flight 183 that they were intercepting the localizer course 1/2 mile west of the outer marker, and cleared the flight for an ILS approach to runway 7 with instructions to . . . "report the outer marker to Burbank Tower on 118.7 (mcs.)."

The 2210 special weather observation made by the U. S. Weather Bureau at Burbank was as follows: Partial obscuration, visibility 1/2 mile, fog, smoke, wind north-northeast 1 knot, runway 7 runway visibility 1-5/8 miles, fog obscuring 7/10 of sky, surface visibility 3/4 mile.

A playback of the communication tape recording of the Burbank Tower (118.7 mcs.) failed to reveal the presence of any transmission to or from Flight 183 on that frequency. However, following the receipt of the approach clearance, there were communications between Approach Control and N 6913C involving the passage of such information as altimeter setting, runway visibility, and distance from the runway. The last contact with Flight 183 at 2211:55, was the flight's acknowledgment of its radar-observed position two miles from the approach end of runway 7. The approach controller stated that the flight, as viewed on his radar scope, appeared to be on the localizer course throughout the approach up to this point. Approximately 20 seconds later the aircraft crashed into a residential/industrial area, approximately 1-1/4 miles from the approach end of runway 7.

The local electric utility company experienced a massive power interruption at 2212:15 in what was later determined to be the area of the accident. The approach controller lost video on his radar scope at this time. After depressing the high-voltage reset button, with no results, he then changed radar channels and video was regained. The controller scanned the radar scope but was unable to observe the radar target associated with N 6913C. At 2212:58, 43 seconds after video was lost, he transmitted the following message over Approach Control frequency: "Tiger 913 if you're still on frequency, cleared to land, and we're getting an alarm on the localizer." There was no reply to this transmission.

Persons closely acquainted with Captain Rader listened to the playback of Approach Control and Local Control recorded communications. It was their consensus that the voice making the transmissions from N 6913C during the approach to Burbank was that of the captain. It was stated that it was often his practice to handle the radio communications while flying the aircraft.

Persons on the ground saw and/or heard the aircraft during the final approach. Their observations beginning near the outer marker and continuing through the final approach are described sequentially as follows:

1. A witness, located between the outer and middle markers testified that the aircraft appeared to be normal with respect to altitude, heading, and position as compared with other aircraft she had observed making similar

^{5/} Burbank Approach Control is located in the tower cab and utilizes ASR-3 surveillance radar. Altitude information is not available with this type of equipment and there is no precision approach radar (PAR) installed.

approaches over a number of years. She further stated that the ground fog was "patchy" and visibility fairly good at this location.

2. Witnesses located immediately west of the middle marker heard the aircraft pass overhead ". . . with very little power on . . ." and unusually low. It was stated that visibility was very poor at the time due to the dense fog.
3. Another witness, located just north of the middle marker observed the aircraft as it appeared out of the fog at a very low altitude. As the aircraft passed his position ". . . full power . . ." was added to the engines at which time he clearly observed exhaust flames and heard the engines ". . . screaming . . ." It then disappeared into a dense fog.
4. A witness located between the middle marker and the accident site first heard the roar of an aircraft and observed the flight as it passed over the rooftop of a nearby house. He estimated it to be at a height of between 20 and 30 feet and in a slightly nosedown attitude. This witness saw several red lights and two white lights on the aircraft but did not see landing lights. He said the fog was beginning to get dense at that time.
5. An FTL employee was standing outside the company electrical shop at the Lockheed Air Terminal about 300 feet north of runway 7. He first observed the approach of the flight approximately two miles out. The aircraft was clearly visible from his vantage point and appeared to be lower than those viewed in the past. He watched the aircraft for approximately 30 seconds during which time it descended, wings level, at a normal rate. It then disappeared from his view. Within five or ten minutes a very dense fog moved in from the northwest.

An airline captain flying in the area 10 minutes after this accident occurred observed the ground fog condition which extended westward from the accident site. The area from the accident site to runway 7 appeared to be clear with the strobe lights, approach lights, and runway lights plainly visible. The top of the fog was estimated to be approximately 100 feet, with clear skies above.

The aircraft initially contacted ground obstacles located 7,696 feet from the approach end of runway 7. This position is approximately 1/2 mile east of ILS middle marker and on the ILS approach course for that runway. The aircraft first brushed the top of a 24-foot high tree, then struck a signboard 22 feet high which was parallel to the aircraft's course. The signboard received slash marks from the No. 1 propeller spaced 52 inches apart. The right wing struck a 65-foot high utility pole at this point. It was determined that the aircraft was on a heading of about 075 degrees magnetic, in a nose-level attitude, and with a left bank angle of approximately 19 degrees. It proceeded for a distance of approximately 700 feet, crashing into several small houses, before it struck and passed through a brick factory building. The rear fuselage section, separated from the aircraft at fuselage station 800 and had almost completed a 360-degree swing-around before coming to rest right side up, approximately 280 feet beyond the factory building. Five dwellings, one factory building, and a workshop were destroyed by impact and fire. Three other houses and one factory were damaged and several powerlines were severed.

The forward section of the aircraft was destroyed by impact and fire. The rear fuselage structure remained essentially intact. The interior of this section was

charred by ground fire. Three ropes for cargo tie-down were found secured to cargo tiedown rings; however, the ropes had failed in tensile overload. All of the tiedown rings appeared to be bent slightly forward. Cargo and passenger doors were found in the locked position.

All four engines and propeller assemblies separated from the aircraft during its disintegration and were recovered in the wreckage area. Nos. 1, 2, 3, and 4 propellers were found at minimum impact blade angles of 18, 20, 20, and 14 degrees, respectively. The low pitch stop setting is 14 degrees. All blades evidenced extensive impact shattering and gouging. Propeller governors for engines 2, 3, and 4 were found at settings of 2,520, 2,508 and 2,590, respectively. A setting could not be obtained from the No. 1 governor because of damage from impact and fire. There was no evidence of any malfunction or failure in any of the engines or propeller assemblies prior to impact. Based on propeller blade angles, governor settings, and measured propeller slash marks, an airspeed of 139 knots at impact was established. The normal approach speed of the L-1049H in this configuration is 140 knots.

The main landing gear and the nose gear were in transit to the retract position at the time of impact. The wing flaps were symmetrically extended to 60 percent. This position corresponds with the recommended approach setting. The flight control system and associated hydraulic booster control units were capable of normal operation prior to impact. No reliable trim tab settings could be obtained due to damage of the system during the impact sequence. The autopilot was capable of normal operation prior to impact. There was no evidence of inflight fire or structural failure.

The two ADF radio receivers were set as follows: No. 1 at 272 kc. (outer compass locator frequency); No. 2 at 260 kc. (inner compass locator frequency). Both VOR receivers were recovered; however, one of the units was damaged from impact and fire and the setting could not be determined. The other unit was set at 109.5 mc., the Burbank localizer frequency.

The pilot's, copilot's, and flight engineer's altimeters were set at 30.15. This was the correct Burbank setting which was provided the flight at 2205 by ARINC. At 2207:23 and again at 2211:09 the captain requested reconfirmation of this setting.

The electrical system was so extensively damaged by impact or fire that nothing could be learned of its pre-impact condition.

Runway 7 at the Lockheed Air Terminal is 6,138 feet long, 300 feet wide, and is on a magnetic heading of approximately 076 degrees. The published field elevation is 775 feet. A standard configuration "A" approach lighting system 6/ with sequenced flashing (SFL/strobe) lights is installed for runway 7. All components of the approach lighting system were on and operating at the time of the accident.

The instrument landing system serving runway 7 is a non-standard installation 7/

6/ This system includes a white-lighted roll guidance bar, a red-lighted terminating bar, and two red-lighted wing bars located 1,000, 200, and 109 feet, respectively, along the approach path to the runway threshold. In addition, there are 59 green lights installed across the end of runway marking the threshold. The strobe lights extend out a distance of 2,695 feet from the runway threshold and consist of 24 units, which emit a 30-million candlepower blue-white light two times per second.

7/ A standard ILS installation is one wherein the localizer antenna is located at the departure end of the runway.

in that the localizer antenna is located at the approach end of the runway. The outer marker, middle marker, and inner-compass locator are 6.0, 1.7, and .4 nautical miles, respectively, from the threshold. (See Attachment A). Electrical power to operate this facility is supplied by a public utility company. Additionally, an auxiliary generator is available to supply power to the localizer, glide slope, and inner-compass locator in the event of a general power failure. All of the ILS components are continually monitored for proper operation by individual automatic monitoring devices. These monitors are designed to detect any change in signal characteristics beyond established limits and to alert tower personnel through an alarm system in the event of a failure.

The maintenance and operational records for this ILS system were examined covering a period of six months prior to the accident. Weekly and quarterly inspections had been conducted on the system during this time with no abnormal or chronic discrepancies reported. The last routine check was performed December 12 through 14, 1962, at which time all components were reported as normal. On the day following the accident, the Federal Aviation Agency conducted a facility flight check on this system. All components operated within acceptable limits.

In addition, the Federal Communications Commission checked for spurious signal emissions that could have affected glide slope reception on N 6913C. A few of these signals were detected; however, it was determined they were not of sufficient strength or on the proper frequency to alter glide slope indication.

Subsequent to the accident a flight test was conducted by the Board in an attempt to duplicate the approach of N 6913C as described by ground witnesses, and to establish its probable flightpath from Lang intersection to the accident site. The test was conducted in an FTL Super Constellation, under night VFR conditions, with instrumentation and radio equipment similar to N 6913C. Three approaches were flown under the direction of Burbank Approach Control and utilizing the ILS. The tests were observed by six witnesses who saw or heard N 6913C on the night of the accident.

None of these witnesses had knowledge of the planned parameters of the test flight; however, all were in agreement that the approach which most nearly duplicated that of N 6913C was the one flown as follows: The third approach was commenced at the outer marker and the flightpath was maintained on localizer course and glidepath to a point approximately 1/2 mile west of the middle marker. The aircraft was then intentionally flown approximately 250 feet below glide slope and crossed the middle marker at a height of 330 feet above the ground at that point.

Surface lighting in the vicinity of the accident site was observed during the test flight to ascertain whether or not this lighting could have been mistaken for approach or runway lights. It was the consensus of the crew and flight observers that the possibility of such a misinterpretation was unlikely.

Complete post mortem examinations of all persons fatally injured in the accident were conducted by the Los Angeles County Coroners Office. There was evidence of possible inflight incapacitation of the captain. While only a portion of the captain's heart was recovered, pathological examination revealed evidence of severe pre-existing coronary artery disease.

A microscopic study of his heart was conducted by the Armed Forces Institute of Pathology (AFIP) in Washington, D. C. The report of this examination to the Board states, in part:

"On gross examination, the anterior descending branch of the left coronary artery showed marked arteriosclerosis with focal calcification. A large number of microscopic sections showed evidence of severe coronary arteriosclerosis as well as advanced arteriosclerotic heart disease with diffuse myocardial fibrosis. None of these changes were acute.

"In the absence of evidence of acute ischemia we are not in a position to state with certainty that the changes present caused pilot incapacitation; however, there remains a very real possibility of this having happened. Persons with this degree of coronary arteriosclerosis are known to be subject to sudden death or incapacitation from acute coronary insufficiency.

"It should be further borne in mind that persons who die suddenly as the result of acute coronary insufficiency rarely show microscopic evidence of coronary insufficiency. Finally it should be remembered that the entire heart was not available for examination and that evidence may thus have been lost."

Expert medical testimony was advanced that during periods of takeoff and landing, pilots are subject to higher blood pressure, increased pulse rate, increased respiration, and are under more stress than normally would be experienced during level flight.

Company records indicated that the captain was 38 years old and that he had been employed by FTL since October 6, 1950. His medical history revealed nothing to suggest any physical defects or an abnormal heart. His most recent FAA Class I medical examination was passed on October 17, 1962, with no limitations.

The only electrocardiogram (EKG) on record for the captain was taken on April 4, 1960, in connection with a semi-annual FAA medical examination.^{8/} No abnormalities were noted.

In addition to his regular semi-annual FAA medical examination taken on April 24, 1962, the captain underwent still another physical examination at the Stanford University Medical Clinic, Palo Alto, California, on May 16, 1962. This examination disclosed no disqualifying abnormalities. In addition to the routine examination, a blood cholesterol test was requested by the patient. The cholesterol level was found in the normal range. According to the medical record, the reason the captain came to the clinic was to obtain a "complete physical examination," and was referred to Stanford by a relative. No EKG was taken at this time.

To obtain more information regarding the condition of the captain's heart and the significance of the findings, medical experts were called upon to testify at a public hearing convened by the Board. A forensic pathologist stated that based on his medical experience concerning persons who have died suddenly, and where evidence of arteriosclerotic heart disease or arteriosclerosis has been found, the captain's heart condition, ". . . would fall into the upper 20 percent of severity. It was very severe." A specialist in cardiology was called upon to testify in regard to

^{8/} Civil Air Regulations Part 67.13(e)(2) - If the applicant has passed his thirty-fifth birthday but not his fortieth, he must, on the first examination after his thirty-fifth birthday, show an absence of myocardial infarction on electrocardiographic examination. (3) If the applicant has passed his fortieth birthday, he must annually show an absence of myocardial infarction on electrocardiographic examination.

the symptoms or manifestations of myocardial infarction in humans. He said, "It may be completely silent in that it doesn't manifest itself by any known clinical symptom. It also may be manifested by the development of pain, of sudden shock or collapse, of sudden episodes of loss of consciousness, of palpitation, and of extreme shortness of breath." Regarding the effectiveness of an electrocardiogram in detecting coronary artery disease he stated, ". . . a person may have severe coronary artery disease and yet have a normal electrocardiogram." He also testified that the captain could have been unaware of the heart condition as found in the histopathological examination.

The captain had accumulated a total of 14,164 pilot hours of which 5,100 hours were in Lockheed 1049 aircraft. On his last company flight check in the L-1049H his performance was rated average to better-than-average. Prior to departing Chicago on the final flight he had had approximately 24 hours of rest time as did the copilot and flight engineer. Those who spoke with him before this flight stated that he was in his usual "good spirits."

The first officer was hired by FTL September 18, 1961, and was checked out as first officer in the L-1049H on October 12, 1961. He had successfully completed a company proficiency flight in the L-1049H on November 16, 1962, at which time he was rated an average to better-than-average copilot with one exception:

Steep turns: average-altitude varied plus/minus 150 feet
Constant altitude: "below average"

FTL required that a copilot receive a check flight, "Captains Report on Copilot," by a line captain at 30-day intervals. This copilot received 12 such flight checks prior to the accident. All of the report forms from these flights contained such favorable comments as ". . . eager . . . willing . . . conscientious . . . knows routes, procedures, interested in doing a good job" All of the captains recommended that he be retained by the company. Although on one of these flights, performed on November 20, 1962, the report indicates that during a simulated surveillance radar approach ". . . he got below suggested altitude, didn't watch rate of descent . . . too slow and low on final approach." A general comment by the check captain also appears on this report, "I believe most copilots have not had enough chance to fly during the last eight months or so and consequently they may not be developing as fast as they should. I think they should be given more of a chance to see what they can do during the first year. . . ." Of the 12 checks received, 6 reports indicated no air work or instrument flying was accomplished.

Company records indicated that at the time of the accident, the first officer had a total piloting time of 4,100 hours of which approximately 560 hours were in L-1049H aircraft. On his application for employment dated August 22, 1961, it was indicated on the flight history portion that he had a total of 3,500 flying hours which included 3,100 hours as pilot-in-command, and 400 hours as copilot in B-17 aircraft. A review of his signed personal flight logbook revealed that as of August 22, 1961, he had a total of 1,532 flying hours of which 1,134 hours were as pilot-in-command. The logbook entries also indicated that at the time of his employment with FTL the first officer had no B-17 time and a total of only 45 minutes in aircraft weighing over 12,500 pounds.

Analysis

All available evidence indicates that N 69130 was properly dispatched from Chicago with the first officer in the pilot seat and the captain in the copilot seat

The flight proceeded to the Los Angeles area in accordance with its air traffic control clearance with no discrepancies reported en route concerning the aircraft or crew.

The investigation revealed no evidence of any failure or malfunction regarding the aircraft, its components or systems prior to impact. There was no evidence of failure or malfunction in any of the airport approach facilities.

Based on the weather forecast the flight received prior to departure from Chicago, the captain would have expected clear weather conditions and visibility well above minimums on arrival at Burbank. Although a below minimum weather report for Burbank was received upon the flight's arrival in the Los Angeles area, the record indicates that the captain then planned to proceed to Los Angeles International Airport if Burbank remained below minimums. The weather conditions at Los Angeles were well above minimums.

The flight had proceeded to the vicinity of the Lang intersection when the weather report which indicated above minimum conditions for Burbank was received. At this point the skies were clear and most of the San Fernando Valley would have been visible from the aircraft.

At the time and place of the accident, shallow dense fog and smoke prevailed with the surface visibility severely restricted to less than 1/8 mile. The top of the fog layer would have been on the order of 150 to 200 feet above the ground. Flight visibility from near 2,000 feet m.s.l. to the top of the fog layer would have been restricted to 3-6 miles in haze and smoke. The surface wind was light and the altimeter setting was 30.15 inches.

The captain advised Approach Control that the flight could descend in VFR conditions and requested to be vectored from Lang ". . . right on in close . . ." to the outer marker. This apparent concern is believed to have been engendered by the reported fog bank near the Burbank Airport and the possibility that the visibility on runway 7 would deteriorate to below ILS approach minimums in a short time. Therefore, if the captain and first officer had not exchanged seats prior to reaching Lang intersection it is highly improbable that it would have been done subsequent to this point. This assumption takes into consideration the unfeasibility of exchanging seats during the planned highspeed, close-in approach to the outer marker.

It is to be noted that the aircraft was equipped with ILS instrumentation on both the pilot's and copilot's instrument panels. The general configuration of the 1049H instrument display is such that all flight instruments can be observed from either seat.

In view of the weather situation and the rapid, highspeed descent to intercept the ILS, it is highly unlikely that the captain would permit the copilot to make this approach. The first officer would be expected to perform the normal duties of a copilot while the captain piloted the aircraft. The voice transmissions emanating from N 6913C during the approach were identified as those of the captain, yet radio communications are normally the responsibility of the copilot. However, it was stated by associates of the captain that he frequently would handle the radio communications coexistent with flying the aircraft.

Based on the test flight data and witness observations, a flight profile of N 6913C was developed. (See Attachment B). It indicates that Flight 183 passed over the outer marker at an altitude of between 3,500 and 3,700 feet m.s.l. (800 to

1,000 feet above glide slope) and that glide slope interception occurred between the outer and middle markers. The landing gear is believed to have been extended prior to glide slope interception. The last radio contact with the flight occurred at 2211:55 at a point two miles from the end of the runway. This contact, "OK understand," was identified as having been made by the captain in reply to a "two miles out," radar position given by Approach Control. Therefore, it is believed that at this point the aircraft was within glide slope parameters at a height of about 650 feet. If the aircraft had descended on through the glide slope at the point of interception and a constant rate of descent were maintained to the point of ground impact, the aircraft would have been approximately 290 feet below the glide slope at or near the last radio contact point. A deviation from glide slope to this extent should have caused a full scale "fly-up" reading on a normal IIS indicator. It is inconceivable that this condition would have been allowed to remain uncorrected to this degree if all was normal on the flight deck. Additionally, the only witness located who observed the aircraft appreciably west of the middle marker stated that the aircraft appeared to be at normal approach altitude.

Approximately 20 seconds elapsed from the two miles out position to the point of initial impact. It is believed that the flightpath changed radically within this short period of time especially considering that at the time of power application the aircraft was at an extremely low altitude.

Thus, the evidence indicates that the professional capability of the captain to fly a normal instrument approach deteriorated suddenly at a point slightly west of the middle marker and shortly after his last communication with Approach Control.

Autopsy and histopathological findings by the Los Angeles Coroners office and the AFIP showed that the captain had coronary artery disease. The extent of this disease was determined to have been sufficient in severity to have caused partial or complete incapacitation, or even death, particularly during a sequence of stressful or anxious moments.

As evidenced by the aforementioned findings and testimony presented at the public hearing by expert medical witnesses, the heart demonstrated severe coronary arteriosclerosis. No positive evidence of myocarditis or thrombosis was found; therefore, the recency of an incapacitating insufficiency could only be postulated. In the absence of contradictory evidence it is concluded that the only logical explanation for the sudden deviation below glidepath of Flight 183 from an otherwise acceptable approach is the sudden complete or partial incapacitation of the captain while at the controls.

The landing gear of N 69130 was determined to have been in transit to the up position at the time of impact. The time involved from the last voice contact from the flight to the time of the accident was 20 seconds. Thus, incapacitation of the captain immediately after the last radio contact would leave the copilot only a minimal amount of time to identify the situation, take whatever action necessary to recover control of the aircraft, and then attempt to fly the aircraft out of a precarious position. The Board believes that the copilot ultimately recognized the situation, applied engine power and initiated landing gear retraction. However, the rate of sink was not arrested and the aircraft continued its descent into the ground obstacles. It may be well to note that due to the location of the landing gear lever^{9/} it is somewhat difficult for a person sitting in the

^{9/} The landing gear lever in the L-1049H is located on the lower right-hand side of the pilot's control pedestal.

pilot seat to move the lever from the extended to the retract position. Not only would this operation preclude a normal scan of the flight instruments but it would also limit vision through the cockpit windshield.

The Board can only postulate as to the reason for the aircraft's radical deviation from the glide slope and its continued descent into the ground obstacles. It is believed that the captain fell forward onto the controls, during or following incapacitation, thereby causing the aircraft to dive below glidepath. Moreover, the position into which he is likely to have fallen or slumped would have limited aft movement of the control column to the extent that the aircraft could not be rapidly rotated to a positive climb attitude. Further, because of the low fog bank condition with the relatively good visibility above, it is believed that the copilot would not be monitoring the captain's approach as closely as he would in an IFR situation. Therefore, following the rapid deviation from glide slope it is probable that N 6913C entered the fog bank before the copilot could fully assume control of the aircraft and then transition to instrument flight conditions. Under these circumstances, it is believed there would have been insufficient time remaining for the copilot to effect a successful recovery.

Evidence disclosed in the investigation indicated that the first officer had significantly falsified his aviation background and flying experience on his application for FTL employment. He had no verified large aircraft^{10/} flying experience prior to employment with FTL, and based on a review of the monthly check flight forms it appears that he had limited experience in the actual control of the L-1049H aircraft. Company records reflect that he had completed an annual flight check on November 16, 1962, approximately one month prior to the accident, yet four days after this check he was written up by an FTL captain for an unsatisfactory simulated instrument approach. The comments noted on this flight report by the captain who was evaluating the first officer indicated that the reason for the unsatisfactory approach was due only to lack of practice. It is debatable, therefore, whether a copilot with this level of experience in heavy aircraft would be capable of coping with a critical situation wherein sole command of the aircraft was suddenly thrust upon him.

Weather is not considered to be a factor in the original glide slope deviation; however, it is believed that it was possibly a factor in the failure to arrest descent and establish a positive climb attitude.

Probable Cause

The Board has determined that the probable cause of this accident was the incapacitation of the pilot-in-command, at a critical point in the approach, resulting in a loss of control of the aircraft from which the copilot was unable to recover

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD
Chairman

/s/ G. JOSEPH MINETTI
Member

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ WHITNEY GILLILLAND
Member

/s/ CHAN GURNEY
Member

^{10/} Aircraft weighing over 12,500 pounds.

S U P P L E M E N T A L D A T A

Investigation

The Civil Aeronautics Board was notified of this accident at approximately 2220 P.s.t., December 14, 1962. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958, as amended. A public hearing was ordered by the Board and held at the Hollywood-Roosevelt Hotel, Hollywood, California, February 7-8, 1963.

Air Carrier

The Flying Tiger Line Inc., is a scheduled air carrier incorporated in the State of Delaware with its principal business office at Burbank, California. It operates under a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the company to transport cargo by air over numerous routes within the continental limits of the United States. The subject flight was conducted under Part 42 of the Civil Air Regulations.

The Aircraft

N 6913C, a Lockheed 1049H Super Constellation, serial No. 4810, was manufactured on March 4, 1957. The Flying Tiger Line Inc., purchased the aircraft from Lockheed on March 4, 1957, when the aircraft had 6.0 hours of flight. The airframe had a total of 20,269 flying hours. It was equipped with four Wright 988TC18-EA3 engines, and four Hamilton Standard 43H60-363 propellers. Engine data are as follows:

<u>Position</u>	<u>Serial No.</u>	<u>Time Since Overhaul</u>	<u>Total Time</u>
1	706158	925.2	8,145.4
2	706174	348.1	9,515.6
3	706094	99.4	12,720.2
4	706104	1,642.3	11,779.3

The Crew

Captain Karl C. Rader, age 38, was employed by The Flying Tiger Line on October 6, 1950. He held airline transport pilot certificate No. 382727 with ratings for C-46, DC-4, and Lockheed Constellation aircraft. He had a total of 14,164 flying hours of which 5,100 were in 1049s. His last proficiency check flight in L-1049H aircraft was on October 12, 1962. His last FAA first-class physical examination was passed on October 17, 1962, with no limitations. He had flown 189.7 hours in the last 90 days, and 70.9 hours in the last 30 days, all in L-1049H type aircraft.

Copilot David L. Grapo, age 24, was employed by The Flying Tiger Line on September 18, 1961. He held commercial airman certificate No. 1301736 with an instrument rating and airplane single and multiengine land privileges. He had a total of 560 flying hours in L-1049 type aircraft. His last proficiency check in L-1049H aircraft was on November 16, 1962. His last FAA first-class physical

examination was passed on September 25, 1962, with no limitations. He had flown 86.7 hours in the last 90 days and 32.3 hours in the last 30 days, all in L-1049H aircraft.

Flight Engineer Jack W. Grey, age 33, was employed by The Flying Tiger Line on November 17, 1956. He held commercial airman certificate No. 626972; flight engineer certificate No. 1362812; and airplane and powerplant certificate No. 1331023. His last FAA first-class physical examination was passed on September 6, 1962, with no limitations. He had flown 170 hours in the last 90 days and 44.2 hours in the last 30 days. His last proficiency check in the L-1049 was flown on December 2, 1962.

Attachment A

Jeppesen Approach Chart

APR 24-62

(11-1)

BURBANK, CALIF.

BURBANK Tower (FAA) ● 118.7 122.5G
122.7G 126.2 260T 3023.5G

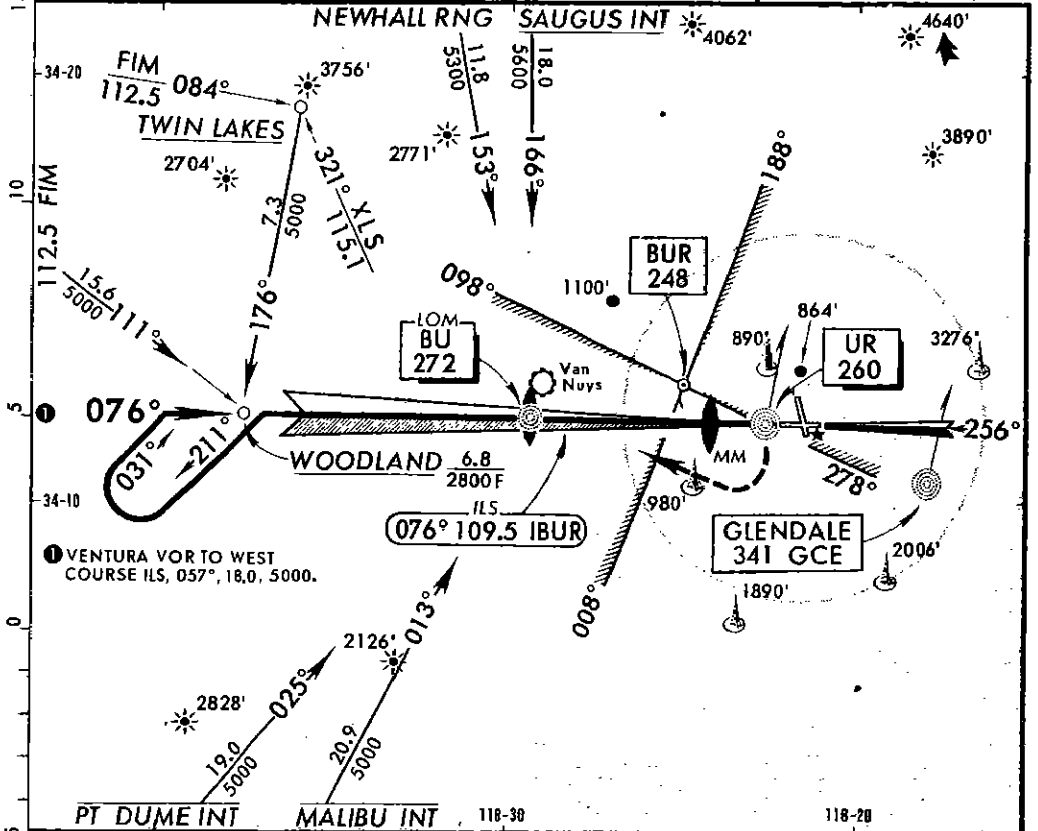
Apt. Elev. 775'
Var. 15°E
GS 332.6

LOCKHEED
ILS 7

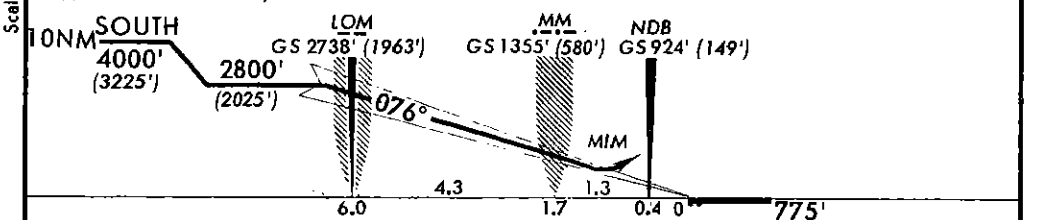
LOC 109.5 IBUR

Approach(R) 120.9	360.6	Departure(R) 118.4	360.6	Ground 121.9	348.6
				118.0C	

SAFE ALTITUDE
20 NM 9500' 40NM 12,500'



NOTE: 1.) Additional radar transitions authorized. 2.) Non-standard installation. Localizer antenna at approach end of runway.



PULL UP: immediately turn RIGHT to 4000 (3225) feet on WEST course ILS within 10 NM WEST of BU LOM, or as directed.

U.S. CAR. 40, 41, 43, MINIMUMS	STRAIGHT-IN RWY 7			CIRCLING*		ALTERNATE		# TAKE-OFF	
	WITH FULL ILS	W/O GLIDE SLOPE	LOM NDB (ADF)	DAY	NIGHT	WITH LOC. AND 3 COMP.	LOM NDB (ADF)	W/O FULL ILS	WITH FULL ILS
1 or 2 Eng. to 65 Kt	300-3/4	400-1	NA	900-1 1/2	900-2	900-2	NA	300-1	300-3/4
2 Eng. over 65 Kt	300-3/4	400-1	NA	900-1 1/2	900-2	900-2	NA	300-1	300-3/4
4 Eng. over 65 Kt	300-3/4	400-1	NA	900-1 1/2	900-2	900-2	NA	200-1/2	200-1/2
JET	300-3/4	400-1	NA	900-2	900-2	900-2	NA	200-1/2	200-1/2

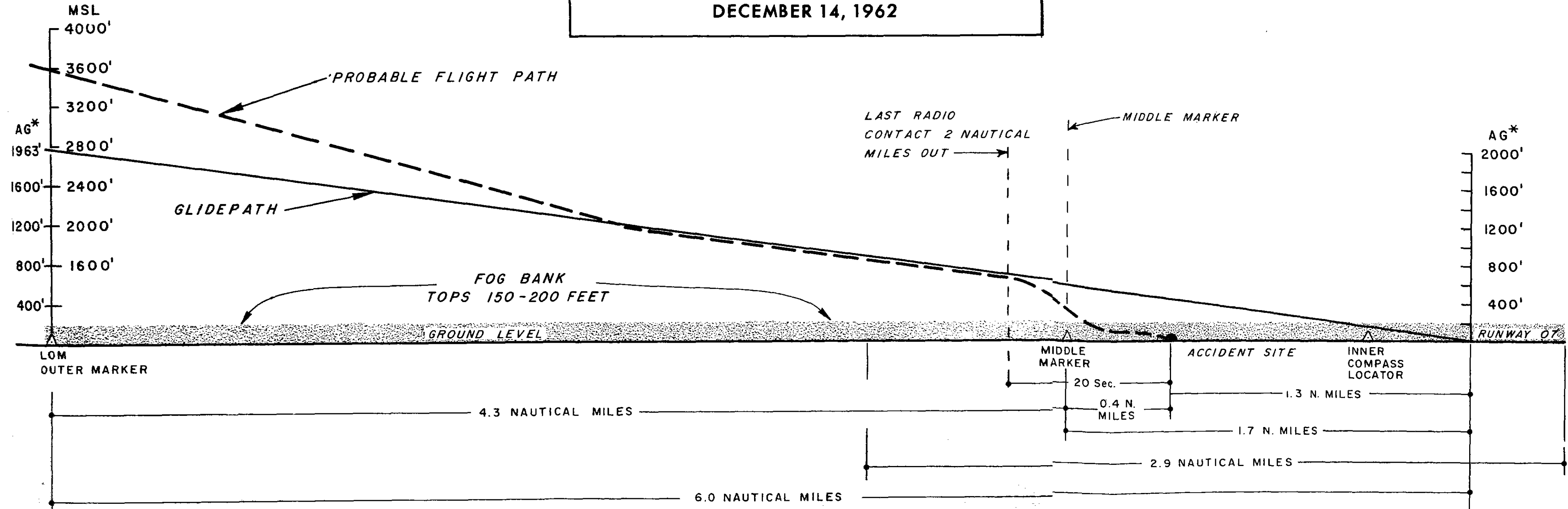
300-1 required on runways 7, 15 and 33. * Maneuvering Northeast & East of airport not authorized. AIR CARRIER NOTE: Sliding scale prohibited below 3/4 mile for take-off on runways 7, 15, 33 & for straight-in landing minimums. Sliding scale not authorized for circling minimums.

Ground speed - knots	CEILING/ALTITUDE CONVERSION							
	60	80	100	120	140	160	180	200
G.S. Descends 3° 00'	318	424	530	636	742	848	954	1060
to Pull-up								

CHANGES: Communications.

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C.A.B.
 Bureau of Safety
PROBABLE FLIGHT PROFILE
FLYING TIGER LINE
 L1049H, N6913C
 NORTH HOLLYWOOD, CALIFORNIA
 DECEMBER 14, 1962



NOTE: GLIDEPATH ANGLE EXAGGERATED FOR DETAIL.

* ABOVE GROUND

Attachment B