File No. 1-0146

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: September 11, 1956 Released: September 14, 1956

RIDDLE AIRLINES, INC., C-46F, N 9904F, HOLLYWOOD, SOUTH CAROLINA
DECEMBER 17, 1955

The Accident

N 9904F, a Curtiss-Wright C-46F, crashed in a cornfield near Hollywood (18 miles southwest of Charleston), South Carolina, at approximately 2040,1/ December 17, 1955. The aircraft was destroyed by impact and fire which followed; both pilots, the only occupants, were killed.

History of the Flight

The aircraft, operating as Riddle Airlines scheduled cargo Flight 207B, departed Idlewild Airport, New York, at 1557, December 17, 1955, for Miami, Florida, with stops scheduled at Wilmington, North Carolina, and Jacksonville, Florida. It carried a cargo of dress goods and first-class mail. The pilots were Captain George Albert Lohr and Copilot Richard John Glendon.

Flying on a VFR flight plan the aircraft landed at Wilmington at 1857, and departed at 1936 again on a VFR flight plan, estimating Jacksonville at 2156. At approximately 2040, at a point near Hollywood, South Carolina, engines were heard by witnesses and lights were seen descending on an erratic path as the aircraft fell in several pieces to the ground.

Investigation

At the time of takeoff from Wilmington, North Carolina, the aircraft was loaded to a gross weight of 47,994 pounds (maximum allowable 48,000) and its load was properly distributed.

The position report transmitted to Myrtle Beach radio was "N 9904F VFR over Myrtle Beach radio 2003E en route to Jacksonville." This transmission was intercepted by Captain Norman Crull who was then near Charleston, South Carolina, northbound in another Riddle C-46. Direct radio contact was established between Crull and Lohr, who asked about surface winds, ground speed, and other conditions encountered by Crull en route from Miami. Lohr made no comment about having any difficulty.

Captain Crull testified that his altitude was 7,000 feet and that he watched for but did not sight N 9904F; he concluded that Lohr's interest in surface winds indicated flight at low altitude, 2,000 to 4,000 feet. Except for a routine position report by N 9904F to Charleston Radio at 2032, Captain Crull's radio contact was the last made with Captain Lohr.

1/ All times herein are based on the 24-hour clock and are eastern standard.

At 1927 and at 2027 on December 17, the U. S. Weather Bureau at Charleston, South Carolina, recorded the following observations: Ceiling unlimited; visibility 7 miles; wind calm.

Captain George Albert Lohr and Copilot Richard John Glendon both held airline transport ratings. They had logges 10,000 hours and 3,300 hours, respectively. Captain Lohr had 731 hours in C-46 aircraft. Their records show they were competent for their assignments.

According to company records the aircraft had flown a total of 1,304:09 hours, of which 304:09 hours were since its major overhaul and its conversion from military cargo model C-46A to model C-46F under civil certification.

Pilot complaints of porpoising and of stiffness in the elevator tab controls were entered in the flight log of the aircraft on 11-28-55 and 12-2-55, and of porpoising owing to elevator controls or trim tabs or their rigging on 12-8-55, 12-11-55, 12-14-55, and 12-15-55. Maintenance entries in the flight log recorded a check of elevator tab rigging on 12-11-55, a change of tension on the elevator Vee tab rod on 12-14-55, and replacement of the right and left elevator spring cartridges on 12-15-55.

1. Wreckage Distribution

The aircraft fragments fell to the ground within an area measuring approximately 2,500 feet north to south and 700 feet east to west. Distribution of the larger fragments and the identity of each are shown in Attachment 1.

The right wing was found 1,118 feet northeast of the main wreckage, the vertical fin approximately 937 feet northeast, the right stabilizer and an inboard elevator section approximately 1,380 feet northeast by east, and the left stabilizer and an inboard elevator section approximately 825 feet north. Most of the remaining empennage, sections of the flap and right wing, left wheel well doors, the three right wing fuel tanks, sections of windshield, and various other small parts were strewn over the same general area.

The main wreckage consisted of the fuselage, wing center section, right engine and propeller assembly, landing gears, and left wing. The entire left power package, including the engine, propeller, cowling, and the nacelle forward of the wing front spar, was found approximately 312 feet south of the main wreckage.

The fuselage, broken in two just forward of the cargo loading door, lay on its right side with the entire cockpit area demolished by fire. Fire damage extended along the floor from the nose and cockpit area rearward well beyond the trailing edge of the wing.

The left elevator and rudder spring cartridges were recovered but the right elevator spring cartridge was not found, although the bell crank to which it attaches was dug out of the ground at a depth of approximately two feet during a special search for the cartridge.

The entire right engine, with nacelle and propeller, was buried in the soft earth at approximately the center of the cockpit area with the right center section and the right inboard flap collapsed over it, and with charred cargo and the mangled overhead electrical panel over them. The left engine nose section was disintegrated and ground fire damage was evident around and to the rear of the carbureter as well as to the front and rear of the firewall on the left side. Careful examination of engines and propellers revealed no indication that they had malfunctioned in any way.

2. Detailed Examination

a. Empennage

Nine pieces of the right horizontal tail were recovered. These accounted for the surfaces except for the portion of elevator between the third and fourth hinges from the tip. Examination of the stabilizer damage disclosed tension failures of the upper spar caps and stringers and compression buckling of those on the lower surface just outboard of the attach angles. Outboard of the failure line there were dents and scratches on the leading edge, skin tears, and diagonal skin wrinkles caused by rearward-acting loads. The right elevator was severed at each of the four hinge stations, the most inboard failure being in line with the stabilizer failure. The portion of the elevator inboard of the fourth hinge from the tip was recovered at the main wreckage site in two pieces, both severely accordioned and flattened from inward-acting loads, indicating that they remained attached to the elevator torque tube through the fuselage until ground impact. The end of the spring tab cartridge was still bolted to its mounting bracket in the accordioned piece of elevator leading edge, but the cartridge was broken off and missing. The spring tab[2] was torn in two by downward bending just outboard of the control horn. The outer portion (Item 24, Attachment 1) had little deformation outboard of the fracture, while the inboard portion was extensively crumpled indicating that it had remained with the main wreckage until ground impact. The spring tab push-pull tube was still bolted to the control horn. At the forward end of the tube the fork end fitting of the spring cartridge[3] shaft was still attached, the shaft having failed from overload. The right elevator trim tab and its controls were intact. Although the bushing required by item 4 of Airworthiness Directive 47-51-2 was not installed, the idler rotated freely on the hinge bolt.

The left horizontal tail separated from the fuselage just outboard of the attach angles because of compression buckling of the stabilizer lower surface and tension failures of the upper surface. The upper surfaces of the stabilizer and elevator outboard of the second hinge from the tip were severely deformed by impact from an object moving downward. The outline of this damage area conforms closely to the shape of the tip and upper leading edge of the vertical tail.

2/ Spring Tab - A tab, spring loaded and connected to the primary controls in such a manner that control efforts by the pilot in excess of a fixed amount cause the tab to deflect and aerodynamically assist the pilot in moving the main control surface against the air forces on the surface.

3/ Spring Cartridge - A mechanism containing a double-acting compressed spring which holds the spring tab in its neutral position until control system loads applied by the pilot exceed a fixed amount.

In this area there were numerous scratches in the surface of the skin. A small fragment of the Grimes anticollision light red filter was imbedded in the stabilizer between the tip hinge bracket and the closing skin.

The Vee tab4/ with its counterweights was still attached and its controls were intact. The tab control cables were broken about three feet inboard of the stabilizer failure.

At the bell crank on the left end of the elevator torque tube the tab push-pull rod end was bent upward and broken off after very extensive deformation. The spring cartridge fork end was broken off from bending loads, with the broken off portions still in the bell crank attachment. The spring cartridge remained attached in the elevator nose section with the shaft bent; this bend in the shaft restricted motion of the plunger on the shaft, resulting in the shaft being free to reciprocate through a small range without any spring load. This spring cartridge bore the stamp "US AIR."

The main portion of the fin (Item 37, Attachment 1) was found in one piece. Directly above the leading edge fracture, the leading edge was deformed by impact loads and the deicer boot was cut and scratched. One to two feet above the leading edge fracture the nose radius was flattened to the left and rear and the surface of the deicer boot was severely scraped. Above this area the leading edge in the deicer boot area was flattened to the right by impact forces, with rivet scratches in evidence on the skin behind the deicer boot. The left side of the tip section was crumpled and scratched by impact with riveted metal. The Grimes anticollision light at the extreme tip of the fin was shattered by impact on the left side, as indicated by deformation of the base. At the bottom of the fin the skin, stringers, ribs, and multi-spars were severely fragmented by a combination of rearward impact forces and bending to the left.

The rudder was torn in two at the second hinge from the top. The lower portion of the rudder remained with the fuselage, held there by the push-pull rod still attached to the walking beam to which the rudder cables attach. The push-pull rods, walking beam at the fin spar, the spring cartridge, and the tab horn were still attached and in operable condition except that the spring tab shaft was bent, restricting the spring travel. The balance weight remained attached to the upper portion of the rudder (Item 36, Attachment 1). The spring tab and the lower portion of the trim tab were found at the main wreckage site with damage consistent with that to the lower portion of the rudder, indicating that they were still attached thereto until ground impact. The upper portion of the rudder trim tab with the push-pull tube, idler, and tab motor still attached were found at the main wreckage site. The fracture at the bottom of the tab was consistent with the rudder fracture directly forward thereof.

4/ Vee Tab - The left elevator trim tab on the C-46F; it has a spring-loaded shaft between the tab horn and the irreversible tab screw, and is rigged 20 degrees higher than the right elevator trim tab. When air forces on the Vee Tab produce more than a fixed load in the spring-loaded shaft, the Vee Tab will deflect downward and reduce the air forces on the tab until they balance the shaft load. This operation is designed to increase the longitudinal stability of the airplane.

b. Wings and Nacelles

The right wing outer panel failed just outboard of the attachment to the center panel. In the fuel tank area there were many indications of compression buckling of the lower surface skin, stringers, and spar caps. On the upper surface the spar caps failed in tension after noticeable downward bending deformation. No evidence of fatigue cracking was found.

The three fuel tanks which had been installed in the right wing were separated therefrom and were found at points indicated in Attachment 1. Each was bent downward near the inboard end, in the area which, when the tanks were in place, was directly in line with the outer wing panel failure. Examination of the right outer panel wreckage in the fuel tank area disclosed no bulging of skin, spar webs, and bulkheads in unstiffened areas or other structural deformation characteristic of explosions.

The wing center section and left outer panel remained with the airplane until ground impact, which severely shattered the center section. Fire after impact melted much of the outer panel.

The left nacelle, with powerplant attached, separated from the left wing and was found at the points indicated in Items 1, 2, 3, and 31 of Attachment 1. The failure on the right side of the nacelle occurred in the upper portion of the attach angle to the front spar and also in the rivets holding the attach angle to the spar in the lower section. The top beam of the nacelle failed in tension and bending to the left at the aft rivets in the fitting in line with the front spar. On the left side, the part of the nacelle just forward of the wing front spar was disintegrated with deformation indicating compression buckling.

c. Controls in Fuselage

All primary system cables were traced and all attachments were found intact. Although the primary control cables were continuous through the autopilot servos, the servo shafts were bent from impact loads. The autopilot mechanism was so severely shattered that its condition before impact could not be determined.

3. History of Aircraft

Curtiss-Wright C-46F (converted from C-46A), N 9904F, was manufactured for the U. S. Air Force at a date which is not now available. This aircraft, serial No. 30262, bore AF No. 42-9660, was procured by the Air Force as a C-46A, and was operated without conversion until it was decommissioned and staked down for storage, with many other inactive aircraft, in the Egyptian desert. There it was abandoned.

Through negotiations with a series of Governments of Egypt, Officine Aeronavali of Venice, Italy, secured possession of this and several other aircraft, some of which, including this one, were sold to Aircraft Investment Company and were transferred by that company to Riddle Airlines on lease-purchase agreements.

4. Conversion for Commercial Operation

a. Conversion Details

In the agreement Riddle was assured that this aircraft would be delivered in America in the condition described as a zero time C-46F eligible by conversion in accordance with Aircraft Specification 3A2 for certification as an air carrier aircraft with a permissible gross weight of 48,000 pounds.

To assist in completion of this complicated transaction Riddle sent personnel to Venice to expedite delivery to Aeronavali of the necessary technical information and material for accomplishment of the conversion to C-46F and its alteration under Specification 3A2. Acceptance of the aircraft in the United States was subject to Riddle's inspection upon delivery.

Aeronavali secured from Curtiss-Wright a license authorizing them to convert C-46's to C-46E's and a set of drawings relative to this conversion, which is identical to that for the C-46F insofar as the tail surfaces are concerned. However, Curtiss-Wright did not supply a complete set of the pertinent drawings or even a complete list of the drawings necessary to make up such a complete set.

Aeronavali's effort to make a satisfactory conversion also included purchase, in the United States from an American firm, of an approved kit of parts for a C-46F elevator. This kit (which was tagged with form ACA-186 certifying to its compliance with CAA approved data) was used in making up jigs for the production of duplicates of its components.

Officials of Aeronavali testified to the effect that where specified material was not available the nearest available material was used such as: Next thicker gauge in sheet dural, steel rods for dural rods, machined parts for castings, etc. In every case the strength of the material in the new part exceeded the strength of the material specified.

Many of the newly installed parts manufactured by Aeronavali were heavier than the original parts but the only vibration tests conducted were those in normal flight. No tests were conducted at maximum diving speed.

To prevent elevator flutter Aeronavali counterweighted the new elevators to provide the same spanwise center of gravity location and unbalance about the hinge line as found on the approved (Custom Air) elevator. Although the rudder was modified, it was not rebalanced at Venice because of lack of drawings.

While Aeronavali was doing this work they were visited by inspection personnel, including a representative of Riddle and Personnel of CAA.

Upon completion of the work, the aircraft was weighed and test flown. A repair and alteration form ACA-337 was executed by a CAA-designated aircraft maintenance inspector (DAMI) employed by and stationed with Aeronavali in Venice.

At the suggestion of CAA, Paris, the aircraft was only registered and was given a ferry certificate for its flight to the United States. Later a standard cargo airworthiness certificate, dated October 15, 1955, was issued for the aircraft in Venice by the above inspector. At the suggestion of CAA, Paris, he inserted above his signature on Form 337 the comment, "Subject to final engineering approval."

b. Check for Airworthiness and Conformity

In the course of the investigation the rudder, elevators, their tabs, and their control mechanisms were compared with applicable Curtiss-Wright drawings specified on a drawing list provided by the Civil Aeronautics Administration. This comparison disclosed many nonconformities, a few of which are described below. Variations from specified dimensions, materials, and surface finish, together with a bow in the shaft, resulted in binding in the spring-loaded elevator Vee tab shaft assembly. The left elevator spring tab cartridge assembly had two concentric springs, neither of which conformed to the single spring specified. Both the inside surface of the larger spring and the outside surface of the smaller spring were polished by mutual interference in operation. In addition, the inside surface of the smaller spring and a collar on the shaft which extends through the spring were polished by interference with one another. Instead of bronze, oilite steel that was not corrosion resistant was used to make the plungers at the ends of the springs. On the right and left elevator spring tab push-pull tubes which parallel the elevator torque tube, the clevises attaching to a common bolt at the centerline of the airplane were made symmetrical instead of offset. This caused misalignment of the tubes. Skin gauges on the elevators and tabs were found to be heavier than specified.

Since both the right and left elevators and elevator tabs of the aircraft were severely distorted, with portions missing, it was impossible to determine the balance of these assemblies experimentally. To approximate the elevator balance it was decided to remove the balance weights from the N 9904F assemblies and install them on a right-hand elevator assembly in possession of Riddle Airlines which was reported to be a spare manufactured by Aeronavali about the same time as those on N 9904F.

Balancing of this assembly indicated that the unbalance as measured from the hinge line was about half of the maximum permitted and the spanwise location of the c. g. was farther inboard.

Analysis

Ground impact marks made by dense pieces of the aircraft indicate that these parts were descending almost vertically. This and the scatter of wreckage, prove that disintegration occurred at an appreciable altitude.

Examination of the wreckage disclosed that the left horizontal tail failed downward after it received a severe downward impact from the fin structure. Both the leading edge of the fin and the leading edge of the right horizontal tail were dented and scratched by impact with rearward moving objects. In addition, the fractures near the root end of the right horizontal stabilizer showed strong evidence of rearward tearing along with downward failure.

Portions of the detached right wing also showed evidence of impact with other objects. From the above, it can be concluded that the right wing failure occurred before the structural failures of the tail surfaces and that portions of the separated right outer wing striking the tail surfaces contributed largely to their failure.

Disintegration of large cargo aircraft in flight is indeed a rare occurrence and the recorded data on such accidents does not establish any pattern helpful in explaining the separation of the left engine nacelle from the wing, with indications of outward loading. From the closeness of the nacelle and main gear doors of the fuselage wreckage it is apparent that the nacelle failure, which had caused the gear doors to be distorted to the left and torn off, occurred late in the sequence of structural disintegration, after the right wing and tail surfaces had separated from the airplane and the main wreckage had descended appreciably. It appears probable, therefore, that the nacelle failure was caused by abnormal inertia loads resulting from the uncontrolled gyrations following failure of the wing and tail surfaces.

The nature of the structural distortions at the right outer wing panel and the downward deformation near the inboard end of all three separated fuel tanks indicate conclusively that the lower surface of the right outer wing panel buckled under high compressive loads and the wing bent downward before the upper surface failed. This sequence of failure results from downward acting loads on the wing which produce stresses in excess of the wing strength. Although such loads can be caused by gusts, all available evidence indicates that the weather at the time and place of the accident did not include the strong vertical movements of the air necessary for such gust intensities. As a result it can be concluded that excessive loads were imposed on the wings by other causes.

Excessive negative loads on the wing during cruising flight are likely to result from either failure or erratic operation of the horizontal tail surfaces. Since analysis of the damage indicates that failure of the tail surfaces resulted from, rather than caused, the wing failure, it appears most likely that the wing failure was caused by erratic operation of the horizontal tail controls.

One possible cause of erratic operation is flutter. Although numerous nonconformities in the elevators and tab controls caused the elevator assemblies to be overweight, an approximate check of the balance by use of another similar elevator indicates that both the unbalance and the spanwise location of the center of gravity of the elevator assembly were less than the maximums permitted for flutter prevention. It appears, therefore, that flutter did not occur.

Another possible cause of erratic operation is malfunction of the autopilot. Because of the severity of damage received on impact and in the subsequent fire, it was impossible to prove or disprove this possibility. In the records of this aircraft's operation there was no mention of any difficulty or malfunction of the autopilot except for low vacuum and undesired sensitivity which was corrected by adjustments made by ground crew.

Although examination of the elevator and elevator tab controls did not disclose evidence to prove beyond doubt that malfunctioning of these controls caused the airplane to pitch down and overload the wing, it did disclose evidence that indicated this possibility. One possible cause is the noted binding in the spring-loaded Vee tab push-pull tube, which resulted from a bow in the shaft and numerous nonconformities in its construction. Pilot entries in the flight logs of the aircraft disclose records of repeated "porpoising" because of malfunction in the elevator or elevator tab controls.

A possible cause of violent maneuvers and concurrent excessive loads is erratic action of the elevator spring tab cartridges. The nonconforming plungers in the recovered left-hand cartridge could have caused binding on the shaft. Wear marks on the nonconforming springs and shaft collar indicate the possibility of erratic action owing to mutual interference. Although the condition of the missing right-hand cartridge is unknown, there is no reason to believe that it was better than the left-hand cartridge and its condition could have been worse. The fact that these spring cartridges were installed in the airplane the day before the accident also tends to indicate the possibility of their malfunctioning having contributed to the accident.

Nonconforming clevises found on the elevator spring tab push-pull rods which parallel the elevator torque tube could also cause binding due to inadequate clearance of the rods with respect to other parts on the elevator torque tube.

Considering the above-mentioned nonconformities, together with others found during examination of the elevator tab controls, it appears likely that their cumulative effects could very well have caused sufficient erratic action of the tabs to pitch the airplane nose-down and produce excessive negative loads on the wing.

These nonconformities were not detected by personnel of CAA, partially because of the unusual handling, through international channels, and partially because of the nonavailability of a complete central file of technical data on the various models of the C-46 aircraft.

Since N 9904F had never before been certificated by CAA and ACA-337 is a form for recertification of aircraft after repair and/or alteration, this form was erroneously executed and was not processed in a manner that would bring it and the DAMI's comment to the attention of CAA Engineering for consideration and final approval.

At Miami, Riddle made further alterations to fit N 9904F into its fleet. These included replacement of propellers, radio, and instruments, and the routine airworthiness inspections but did not include any check for conformity with requirements for C-46F (despite the DAMI's comments on form 337 the need of checking conformity was overlooked.)

As a result of this accident and its investigation, the Board called to the attention of the Administrator of Civil Aeronautics the nonconformities found in the aircraft and the nonavailability of complete files of drawings.

In reply, on March 22, 1956, the Administrator reported that CAA had taken measures to prevent recurrence of these nonconformities, the unavailability of accurate information and drawings, and the shortage of legitimate replacement parts. In view of nonconformities and other discrepancies found in C-46 aircraft modified by the agency involved, the designated aircraft maintenance inspector was requested by the CAA Administrator to discontinue all DAMI functions pending further investigation of the reported difficulties. The agency was also informed that no further certification would be performed at Venice until a complete review had been conducted and all necessary data were available to assure full compliance with applicable requirements of the Civil Air Regulations. Aircraft subsequently modified for Riddle Airlines have been ferried to the United States for inspection and certification.

In addition, the CAA issued Air Carrier Maintenance Alert Bulletins #235 and #240. Several conferences were held at Venice, Italy; Paris, France; Miami, Florida; and Washington, D. C., with the objectives to make known the fact that unsafe parts have been manufactured, to bring into being an adequate supply of safe, legitimate parts, and to establish appropriate drawing lists for pertinent type certificates.

As a matter of further interest, an investigation has been undertaken by CAA with respect to C-46 nonconforming parts, which are appearing in increasing quantities owing to the present shortage of legitimate parts. Many of these parts have the appearance of genuine parts and carry numbers and other identification established by the original manufacturer.

Findings

On the basis of all available evidence the Board finds that:

1. Certification of the crew was in order.

2. The aircraft was loaded within prescribed limits of weight and center of gravity.

3. No indication of fatigue cracking, fire, or explosion in flight was found.

4. The right outer wing, the tail surfaces, and the left engine nacelle separated from the aircraft in flight.

5. Downward failure of the right wing from excessive aerodynamic loads was first in the sequence of structural failures.

6. Numerous nonconformities were found in the elevator tab controls; some of these showed evidence of having caused erratic action of the elevator tabs.

7. These nonconformities made the airplane ineligible for airworthiness certification.

8. Both the Civil Aeronautics Administration and Riddle Airlines should have detected the nonconformities.

9. The cumulative effect of these nonconformities produced a pitch-down of sufficient severity to cause failure of the right wing.

Probable Cause

The Board determines that the probable cause of this accident was an inflight structural failure resulting from a violent pitch-down induced by the erratic action of nonconforming elevator tab controls.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE
/s/ HARMAR D. DENNY
/s/ G. JOSEPH MINETTI

Adams, Vice Chairman, and Gurney, Member, did not participate in the adoption of this report.

SUPPLEMENTAL DATA

Investigation

The Civil Aeronautics Board was notified of this accident at 2255 on December 17, 1955. An investigation was started immediately in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. Depositions were taken at Miami, Florida, on January 31, February 1, and April 13, 1956, and at Hollywood, South Carolina, on February 2, 1956.

Air Carrier

Riddle Airlines, Inc., is a Florida corporation engaged in scheduled cargo service under certificates of public convenience and necessity issued by the Civil Aeronautics Board and air carrier operating certificates issued by the Civil Aeronautics Administration. The certificates authorized flight between New York, New York, and Miami, Florida, and other points.

Flight Personnel

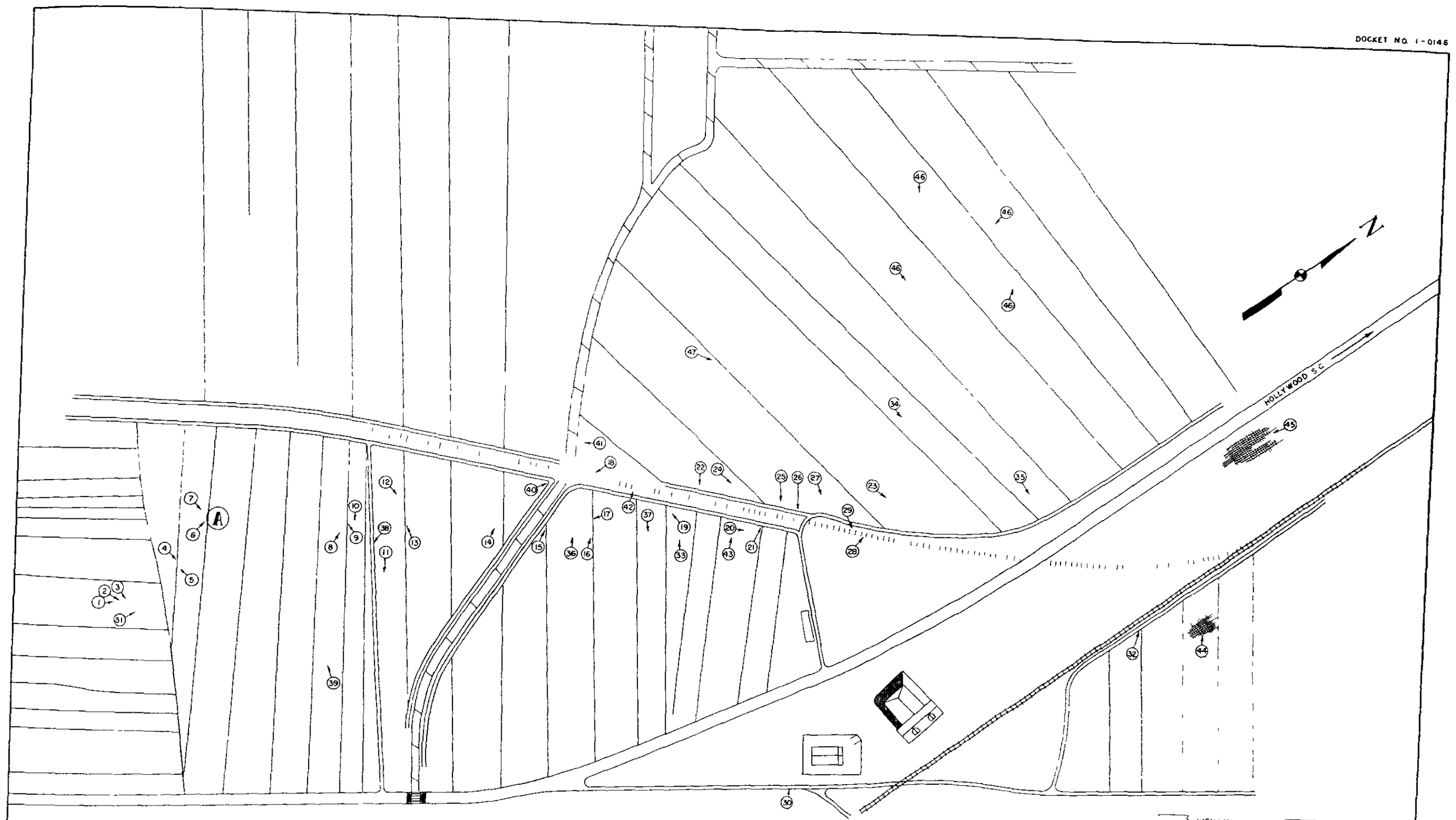
Captain George Albert Lohr, age 31, was employed by Riddle Airlines as a pilot on February 1, 1953, and was promoted to captain March 1, 1953. He held a valid airline transport pilot certificate with a rating for the subject aircraft. Captain Lohr had approximately 10,000 flying hours, of which 731 hours were in C-46 aircraft. He successfully passed a class one Civil Aeronautics Administration physical examination, no waivers, on June 17, 1955.

Copilot Richard John Glendon, age 36, held a valid airline transport pilot certificate with a rating for the subject aircraft, and had flown approximately 3,300 hours. He successfully passed a class one physical examination, no waivers, on June 24, 1955.

The Aircraft

N 9904F, a Curtiss-Wright C-46F, serial number 30262, was owned and operated by Riddle Airlines, Inc., and was certificated by Civil Aeronautics Administration under type certificate #3A2. It was equipped with two Pratt and Whitney R-2800-75 engines and two Hamilton Standard propellers with model 23E50-505 hubs and model 6491A-6S blades. The aircraft had been operated by the United States Air Force in the European Theatre and had been staked out as an inactive aircraft in the Egyptian desert for some time prior to its conversion to a C-46F

DOCKET NO. 1-0146



(A) AIRPLANE FUSELAGE

1 LEFT LANDING GEAR UPLATCH
2 LEFT ENGINE PROP BLADE
3 LOWER LEFT NACELLE PIECE RIGHT HAND SIDE
4 3 FEET LEFT INBOARD ELEVATOR
5 LEFT ELEVATOR T P 6 FEET
6 FLARE
7 BELLY HYDRAULIC ACCESS DOOR
8 THERMOS BOTTLE
9 PIECE OF LEFT WINDSHIELD
10 LEFT NACELLE DOOR (LEFT SIDE)
11 RIGHT FRONT FUEL TANK
12 PIECE OF FIN BASE
13 SMALL PIECE OF NACELLE
14 SMALL PIECE OF WING
15 RIGHT FLAP PIECE 4 FEET-INBOARD PIECE RIGHT OUTBOARD-NEARBY FUEL TANK CRADLE (SEE 23)
6 PIECE OF VERTICAL FIN SPAR TANK CRADLE IN DITCH
17 RIB FIN
18 LEFT STABILIZER 7 FEET OF LEFT ELEVATOR V TAB PIECE OF RED FILTER ANTI COLLISION LIGHT FOUND ON INBOARD SIDE OF OUTBOARD HINGE BRACKET
19 SKIN PIECE OF FIN
20 PIECE OF NOSE RIB WING
21 RIGHT REAR FUEL TANK
22 FUEL TANK VENT LINE
23 RIGHT OUTBOARD PART OF RIGHT OUTBOARD FLAP (SEE 15)
24 PIECE OF ELEVATOR TAB AND PIECE OF SKIN UNKNOWN OILY MARKED 24
25 JEPCO CHART NO 19 & 20 AND PIECE OF STRINGER BULB ANGLE PROBABLY WING LEADING EDGE
26 PIECE OF WING SKIN AND STRINGERS
27 3 FEET WING SKIN AND STRINGERS
28 LEADING EDGE RIGHT WING 5 FEET INBOARD SIDE OF OUTBOARD PANEL
29 PIECES OF FLAP TRAILING EDGE
30 RIGHT STABILIZER 3 FEET OF ELEVATOR AND ELEVATOR TRIM TAB
31 LEFT ENGINE
32 PIECE OF RIGHT HORIZONTAL STABILIZER
33 RIGHT AILERON TIP 8 FEET
34 RIGHT ELEVATOR TIP 7 FEET
35 FLAP WELL PIECE RIGHT WING INBOARD OF OUTBOARD WING PANEL
36 TOP OF RUDDER
37 VERTICAL FIN
38 LEFT NACELLE DOOR (RIGHT SIDE)
39 RIGHT CENTER FUEL TANK
40 LEFT LANDING GEAR SPLASH SHIELD
41 PIECE OF VENT LINE
42 CAPTAIN'S NOTEBOOK (USUALLY CARRIED IN SHIRT POCKET)
43 RIGHT WING
44 WINGWALK
45 AIRFORCE RADIO FACILITY BOOK (SHREDDED)
46 MAINTENANCE MANUAL COVER AND A FEW SCATTERED PAGES
47 PIECES OF BONDING FROM HYDRAULIC LINES GANG BLOCKS

HIGHWAY
FIELD ROAD
RAILROAD SINGLE TRACK
RAILROAD ABANDONED
LARGE DITCH
NARROW DITCH
BRIDGE

ATTACHMENT 1

RIDDLE AIRLINES, INC C-46F N9904F
WRECKAGE DISTRIBUTION CHART
HOLLYWOOD, SOUTH CAROLINA
DECEMBER 17 1955

100 50 0 100
Approx. Scale in feet

Comm DC 8/1/56

CAB - AIRCRAFT ACCIDENT REPORTS - 1956

1 Columbia Geneva Steel Company, Lodestar,
Near Tyrone, Pennsylvania, December 20

2. Phillips Petroleum Company, Lodestar,
Bartlesville, Oklahoma, December 12

3. Trans World Airlines, Martin 404, N 40404,
Las Vegas, Nevada, November 16

4. Trans-Canada Air Lines, Viscount, CF-TGR,
Flat Rock, Michigan, July 9

5. TWA, Lockheed 1049A, N 6902C, and UAL, Douglas DC-7, N 6324C,
Grand Canyon, Arizona, June 30

6 Piedmont Airlines, DC-3C, N 45V, Nr Shelby,
North Carolina, June 13

7 Trans World Airlines, Martin 404, N 40428,
Pittsburgh, Pennsylvania, June 7

8. Crane Company, Lockheed PV-1, N 64001,
Nr Jeffersonville, Indiana, May 15

9 Cordova Airlines, Aero Commander, N 5386N,
Skilak Lake, Alaska, April 9

10 Northwest Airlines, Boeing 377, N 74608, in Puget Sound,
Nr Seattle, Washington, April 2

11. Trans World Airlines, Martin 404, N 40403,
Pittsburgh, Pennsylvania, April 1

12 Northeast Airlines, Convair 240, N 90659, Portland, Maine, March 29

13 West Coast Airlines, DC-3, N 62374, Pullman, Washington, February 26

14 Capital Airlines, Viscount, N 7404, Chicago, Illinois, February 20

15. Eastern Air Lines, Martin 404, N 445A,
Owensboro, Kentucky, February 17

16. Swiflite Aircraft Corporation, Lockheed PV-1, N 2000C,
Nr Smithtown, New York, January 26

17 Eastern Air Lines, Martin 404, N 487A, Tri-State Airport,
Huntington, West Virginia, January 16