

AIRCRAFT ACCIDENT REPORT ✓

ADOPTED: August 8, 1958

RELEASED: August 13, 1958

WESTERN AIR LINES, INC., CONVAIR 240, N 8405H,
NEAR PALM SPRINGS, CALIFORNIA, FEBRUARY 13, 1958

The Accident

At 1344, ^{1/} February 13, 1958, just after takeoff, Western Air Lines Flight 19 experienced severe control difficulty and made an emergency gear-down landing in the desert four miles north-northwest of the Palm Springs, California, Airport. During the ground roll the aircraft, a Convair 240, N 8405H, struck large boulders in its path and fire occurred which consumed the major portion of the aircraft. There were no fatalities but serious injuries resulted to 5 of the 18 passengers and minor injuries to most of the others. The crew of three received minor or slight injuries.

History of the Flight

Western Air Lines Flight 19 is a scheduled passenger service between Las Vegas, Nevada, and San Diego, California, with an intermediate stop at Palm Springs, California. On February 13, according to normal scheduling, the aircraft, N 8405H, used on Flight 19 was flown from Los Angeles to Las Vegas as Flight 12. This was the first flight for the airplane following a No. 3, areas 1 and 3, heavy maintenance, check performed by the company at its overhaul base located on the Los Angeles International Airport. The flight crew of Trip 19, who also operated Trip 12, consisted of Captain Richard E. Schumacher, First Officer James R. LeBel, and Stewardess Barbara F. Grimes.

Following crew preparation for both flights, Trip 12 was completed in a routine manner. At Las Vegas 330 gallons of fuel were added to the existing fuel on board, making a total of 700 gallons. No maintenance and no other pertinent services were performed or requested. Departure from Las Vegas was at 1230, about 15 minutes behind schedule, the result of minor unrelated delays. First Officer LeBel, seated in the captain's seat, flew the aircraft to Palm Springs while Captain Schumacher, in the right seat, supervised the flight and performed the duties of first officer. The flight was planned according to a DVFR (Defense Visual Flight Rules) flight plan. Upon reaching the intended cruising altitude of 10,000 feet mild turbulence was encountered and for passenger comfort the altitude was changed to 12,000 feet. Otherwise, in clear weather conditions the segment to Palm Springs was uneventful and arrived at 1330.

The Palm Springs stop was for passenger changes only; therefore, the crew remained on board and the aircraft did not receive attention. After about six minutes at the terminal the engines were restarted and First Officer LeBel taxied the airplane to runway 31 for takeoff. Pretakeoff checks were completed

^{1/} All times herein are Pacific standard based on the 24-hour clock.
Altitudes are mean sea level unless indicated otherwise.

during which the engines, propellers, and instruments gave normal indications. The gross weight of the Convair was 35,655 pounds, which was 4,742 pounds less than the maximum allowable for takeoff. According to the load manifest the load was distributed within the center of gravity limitations.

About 1342 Flight 19 took off from runway 31. The takeoff appeared normal, and the aircraft climbed to approximately 500 feet above the ground. At this time several ground witnesses saw two or more silvery pieces separate from the aircraft. Most witnesses said the pieces seemingly separated from the area of the right wing. Almost simultaneously the aircraft was observed to nose down sharply and descend at a steep angle. As it neared the ground it leveled off considerably but continued to descend. It contacted the ground raising a large cloud of dust and then disappeared from the view of the observers behind intervening higher terrain. Seconds later large columns of smoke were seen rising from the accident site.

Weather conditions were no factor in the accident.

Investigation

Prior to the origination of Flight 12 the pilots performed a preflight walk-around inspection of the aircraft. The description of this inspection by the pilots indicated it was in accordance with company procedures. It also showed that the inspection would have revealed discrepancies of a nature which would normally be detected during the pilot walk-around. However, none were noted.

Both pilots stated that except for about four degrees left aileron trim required during climb and about 3-1/2 in cruise, N 8405H, its powerplants, and all equipment functioned perfectly. The amount of trim necessary, they stated, was within allowable tolerance for continuation of the operation but would have been written up after the completion of Flight 19.

The pilots stated that the takeoff roll was entirely normal and when the aircraft was approximately 30 feet above the runway the landing gear was retracted. Thereafter, takeoff flap was raised and power was reduced to METO (maximum except takeoff). When it was determined that no appreciable turbulence existed and about 1,000 feet (550 feet above the ground) was reached the first officer called for climbing power. The pilots stated the climb angle was normal and the airspeed was 155 knots. The first officer made a slight right bank to keep another aircraft in sight and then rolled out. At this instant there was a noise which impressed the pilots as being a structural failure. First Officer LeBel, who continued to fly the airplane, said the elevator control became "sloppy" and the aircraft began "bucking" and "buffeting" in a manner "as bad or worse than a secondary stall." The nose of the aircraft dropped, and elevator control would not raise it. First Officer LeBel said that at this time he doubted if he would be able to control the aircraft and told Captain Schumacher he thought they must have a "broken elevator." Both pilots stated that they agreed a crash landing was inevitable and that the nose would have to be raised to accomplish it. First Officer LeBel stated that he then pushed the nose down to a 30-40 degree angle and added nearly full power. When the airspeed increased to 240-260 knots the first officer sensed a partial regaining of elevator control. He then added full power and when about 300 feet above the desert began

decreasing the angle of descent. The first officer said that when the aircraft was about 50 feet above the ground Captain Schumacher asked if he wanted the landing gear down. The reply was affirmative. When the landing gear extended the first officer said that he noted somewhat more positive elevator control. He said that he was able to raise the nose of the aircraft so that ground contact occurred main gear first, the nose slightly raised. The specific touchdown speed was unknown but the first officer thought it was in excess of 200 knots.

A passenger seated on the right side of the aircraft in the window seat of the first row stated that at the outset of the vibration he saw a large piece of the right wing break loose and "flop back and forth" on the wing. He said this lasted three to four seconds, then the piece separated from the wing. He said when the piece was gone a mass of tubing and pipes was exposed along the front of the wing. At least one other passenger saw a piece flash past his window at approximately the time the buffeting started.

The buffeting in the cabin was described by several passengers and the stewardess. One passenger said the aircraft "bobbed like a cork on a stream," and another said the buffeting made it difficult to get hold of her safety belt clasp to pull the belt tighter. The stewardess stated the buffeting spilled galley equipment onto the floor, hurled her equipment kit down the aisle, and even shook her stewardess cap from her head. She doubted that she could have stayed in her seat if her seat belt had not been fastened. She said there was no pattern to the buffeting and it was equally severe up and down and from side to side.

The crew said the aircraft rolled fairly well over the rough terrain until it struck boulders which were scattered over the desert surface. They stated the landing gear failed when it struck the boulders and mounds of drifted sand. The aircraft then slid to a stop and fire broke out in the left wing. Almost at once the fire spread and became uncontrollable.

Because of the fire on the left side of the aircraft the evacuation was accomplished through exits on the right side. The front loading door was opened by Captain Schumacher and the first and second window exits on the right side by passengers. A third passenger, with Stewardess Grimes at his side, attempted to open the rear emergency door but found it was jammed.

According to the crew and passengers, the evacuation was fairly well distributed through the three openings. It was done in an orderly and rapid manner with most agreeing it required less than a minute. It was also agreed that seat belts remained intact and the seats anchored to the floor. The leg of one passenger was broken when it was caught in a seat or became entangled in a safety belt as he was stepping through the second window exit. There was no panic and passengers moved well away from the fire fully cognizant of the possibility of an explosion. The captain and first officer then checked the cabin to be sure all were out. Many passengers were highly complimentary of the efficient manner in which the pilots and stewardess handled their duties.

Investigation at the accident scene revealed that the aircraft initially contacted the ground four miles from the far end of runway 31. This area is desert land which, although relatively flat, has many sharp rises, depressions, and mounds of drifted sand. It is also strewn with thousands of large and small

boulders buried or partially buried in the desert floor. The initial contact was evidenced by intermittent tire tracks on a magnetic heading of 320 degrees. The tracks were apparent over a distance of about 600 feet at the end of which the left main gear struck and was torn off by a huge boulder. This gear was located about 100 feet past the boulder and about 45 degrees to the right. The absence of marks in the sand showed the gear was lofted to the final resting place.

The aircraft continued straight ahead through many boulders, over dunes, and uneven terrain which subjected it to severe impact forces. With the left gear off the impacts caused major components of the aircraft to separate along the wreckage path. The left propeller dome was found 700 feet from the initial ground contact and at 1,100 feet the left engine nose case and propeller came to rest. A few feet farther and slightly to the right the right engine nose case and propeller were located. Numerous smaller pieces of aircraft structure were strewn along the path at various distances. The right wing was sheared off and it came to rest inverted 1,185 feet past the initial contact point. Just beyond this wing the right engine power section and right main landing gear were found.

The remaining portion of the aircraft stopped upright a few feet past the right wing and engine. This portion consisted in the main of the fuselage, left wing and engine, and portions of the empennage. Although completely gutted by fire, the fuselage, according to testimony of the crew and passengers and some physical evidence, apparently withstood the severe ground impacts and came to a stop in relatively good condition. Because of the destruction by fire it was impossible to determine why the rear emergency exit was jammed.

The major portion of the right wing leading edge between the fuselage and right engine nacelle was found about one-half mile past the far end of runway 31. This location relative to the aircraft wreckage site confirmed ground observations that this component had separated in flight.

This portion of the right wing leading edge is installed as an individual section of leading edge. Its size is 52 inches long and 25 inches deep, and it serves as part of the airfoil design by forming the leading edge of the wing inboard of the right engine nacelle to the fuselage. Its construction is a series of six former ribs over which the wing skin is attached. The component is hinged on the top side with a "piano hinge" enabling it to be raised for inspection and/or repair purposes. In its down position the leading edge is secured by a series of 27, 10-32 x 11/16, stress screws installed from the bottom edge of the leading edge into an equal number of 10-32 self-locking nuts mounted on the lower spar cap of the wing. Gap straps are used to cover the small spaces on each side of the leading edge when it is in the down position. The gap straps are flexible metal strips retained by screws at the top. At the other ends, or bottom ends of the straps, are cross pins which serve to connect the straps into a turnbuckle overcenter latch assembly which is for the purpose of adjusting and drawing up the straps. The turnbuckle overcenter latch unit is screwed to the lower spar cap. Over the gap strap length a series of 12 fasteners is incorporated to hold the strap and prevent it from "ballooning" in flight. Although the straps do hold the leading edge down to some extent they are not intended to serve this function.

As noted, the leading edge component was recovered about one-half mile from the far end of runway 31. It was relatively intact except that the skin

covering, about one-half of the heater duct, and the piano hinge were missing. A major portion of the skin and the heater duct were located about 200 yards beyond the leading edge. The hinge was recovered with the right wing and although badly impact-damaged it was still attached to the wing. The missing balance of leading edge skin, a piece about 18" x 18", was attached to the hinge.

The self-locking nuts which were previously mentioned as serving to retain the 27 stress screws are normally held in position by a "gang channel" riveted to the lower spar cap. The gang channel was recovered in several sections with 21 of the 27 self-locking nuts still in place. The channel was recovered in the main wreckage separated from the wing spar cap by impact forces which sheared the retaining rivets.

Each of the self-locking nuts was meticulously examined under a magnifying glass for any evidence of pulled threads, sheared screws, or other evidence which would indicate that the stress screws were in the nuts at the time of the accident. The nuts were examined in their recovered condition and again after they were cleaned. There was no evidence which indicated the screws were in the nuts. In fact, the threads of each nut were found to be in good condition; none was pulled and there were no screw portions in any of the nuts. Also, a search in the wreckage and along the ground and flight path failed to recover any of the screws normally used to secure the leading edge.

The countersunk screw holes in the leading edge showed no evidence of abnormal elongation, marks, or tearing which would be present if screws had worked loose allowing the middle portion of the bottom of the leading edge to "work" or "balloon."

Both gap straps were recovered. One was found just beyond the airport boundary and the other was with the main wreckage. Their examination revealed that both had failed from loads beyond their design strength. Failure occurred when the cross pins pulled out of the turnbuckle assembly. The turnbuckle and overlatch assembly remained in place.

Except in areas noted, the continued examination of the aircraft, its engines and propellers, and other major components revealed no discrepancies. They were determined as not having been factors in the accident. This was substantiated by the pilots who said that there was no other difficulty other than the one involving controllability of the aircraft after the leading edge separated.

As indicated, N 8405H received a No. 3, areas 1 and 3, (heavy) maintenance check just before the aircraft left Los Angeles as Flight 12. The flying time involved since the inspection was two hours, nine minutes.

With regard to the maintenance check the investigation revealed that the aircraft entered the maintenance hangar at approximately 1600 on February 12, the afternoon before the accident. The lead mechanic on duty instructed some of his crew to open all inspection doors which included the right and left wing leading edges. The work was done by several mechanics. The aircraft inspector then went over the aircraft, noted and wrote up items for correction. Two discrepancies were located in the area exposed when the right leading edge was raised. Investigation disclosed these items were corrected and signed off

before 0030 Wednesday morning when there was a shift change. Because the closing of all inspection plates is one of the final actions during a maintenance check the right leading edge and all other inspection plates remained open.

The check continued and about 0330 it was time to close the many access panels, inspection plates, and covers. The lead mechanic assigned personnel to this job, one of whom was borrowed from the engine crew. This mechanic, a certificated airframe and powerplant mechanic, was assigned to close the right leading edge and other openings on the right side of the aircraft, a job requiring considerable time.

The mechanic recalled that he first checked the self-locking nuts for security in the gang channel. He then determined the proper screw length, unhooked the right leading edge from its raised position, and lowered it into place. Although other mechanics said it was customary to put the stress screws in along the bottom of the leading edge before installing the gap straps the mechanic in this instance initially stated that he installed the straps first and experienced no difficulty.

Later, at the public hearing, the mechanic testified that he believed after lowering the leading edge he then put in a few screws along the bottom edge of the leading edge to align and hold the component. He said he partially tightened these screws. He said that the screws used were obtained from his tool box because, although he looked, he did not see the screws originally taken out. At least two mechanics, however, stated they had seen them hanging in a rag at the leading edge opening. He stated that he then installed the gap strap overcenter latch assembly with screws and pulled up the straps as required. The witness said he had obtained an air-driven screw driver at this time and to his best recollection had installed the remaining screws and fully tightened the few which had been initially put in and partially tightened.

An engine lead mechanic stated he had seen two screws being tightened by the mechanic using the air-driven screw driver. He, however, did not recall the precise area (gap strap or bottom leading edge) where the screws were being tightened.

An examination of the mechanic's tool box disclosed a supply of various type screws. The supply included 10-32 screws of both 11/16 and 9/16 lengths. These, and the others, were separated in individual small containers.

During the public hearing the mechanic was asked directly, if, in view of the evidence indicating that there were no screws installed along the bottom edge of the leading edge, he might have forgotten to install them. In response the witness stated, ". . . it just doesn't seem like they were in it." When asked, the mechanic revealed factors of a personal nature which could have contributed to forgetting the screws. These reasons were verified by Board investigators.

The mechanic said that he believed the work on the leading edge required about 30 minutes and he completed the task at approximately 0400. He then continued to close other openings for most of the remaining shift.

According to Western Air Lines maintenance procedures at the time of the accident the responsibility for ascertaining that all inspection openings are properly closed and secured was that of the lead aircraft mechanic. This is expressed in the company's maintenance manual (2.2.3(d)) as follows: "The lead mechanic will make a walkaround inspection of the aircraft to ascertain that ALL ACCESS DOORS, PLATES, OPENINGS AND CARGO PIT LINING IS IN PLACE AND SECURED and sign off the applicable line on the Master Card." The replacement and security of all access doors, plates, and covers is one of five items to be individually certified on the bottom of the master work record form. This item is to be signed for by the lead mechanic indicating satisfactory completion prior to returning the aircraft to service.

The lead mechanic who was charged with this responsibility stated that he made the inspection in his usual manner. This, he said, was to determine that no plates were open and/or hanging down. In response to questions he said that he did not check each plate "screw by screw" but that he went over the airplane looking into various areas and sighting over its exterior surfaces and then checked the cargo pit lining. He said that he could not, from his inspection, state whether or not the leading edge screws were in place but that his inspection would normally reveal any screws sticking out or plates which were not flush with the aircraft surface. He said that he expected a mechanic with airframe and powerplant ratings to do the job of "putting up plates" properly. The witness indicated that he believed there was a certain amount of work which those mechanics do which need not be checked on. He said, "I shouldn't have to check everything." The lead mechanic estimated that detailed inspection of each and every plate on the Convair would require about 45 minutes. He said that such an inspection, in consideration of his other duties of directing, coordinating, and assigning the work to be done by up to 12 men, would be very difficult. He added that in his view the inspection in issue was more properly the function of an inspector rather than that of the lead mechanic. The witness stated that after completing the inspection he had signed for the work on the master work record form and when he was relieved he reported to the incoming lead mechanic that the plates were closed.

Another lead mechanic was questioned during the hearing concerning the manner in which he performed the walkaround inspection and his understanding of the company instructions delineating the responsibility to the lead mechanic. He said that the instruction was quite clear to him and that it means "just what it said" to inspect the plates, see that they were in place and secured. He indicated that his method of accomplishing the inspection was to view the plates from close proximity, looking for proper placement, looseness, and/or missing or partially tightened screws. He said that this was the only way he knew how to do the job. He indicated the responsibility was part of his work and he did it taking the time which the task required. He considered the responsibility very important and said when he "bought off" an item he ascertained personally that it was done to his own satisfaction. He also considered his responsibility as a necessary check on the work of another mechanic. Other maintenance personnel testified in substantial agreement with this lead mechanic.

During the investigation and public hearing an overall review of the company's maintenance practices, procedures, and policies was included. This was done believing firmly that these areas, particularly those relating to the heavy check phase, were properly part of the Board's responsibility in accident investigation.

The maintenance structure, in most respects, is comparable to other air carriers. Maintenance planning and instructions originate with the Director of Maintenance and are passed to a shift foreman who in turn passes them through lead mechanics to the individual mechanic. The company utilizes a progressive maintenance and card system. In general, the cards show work to be done according to the check being performed and a master work record form designates the cards appropriate for the check. Items completed are initialed by the mechanic completing the work and when the card is finished the lead mechanic, or foreman, ascertains that the work has been signed off. The mechanic's work of closing the panels and plates, however, did not require his initials as indicating work having been done.

Items considered by the company to require inspection and sign off by an inspector are indicated by an asterisk beside that item on the card. Other items requiring the reinspection by an inspector are designated as "red and black" line items. These are designated in the maintenance manual or are so determined by the inspector working the aircraft. In addition, other items requiring reinspection are those defined in the company maintenance manual "CV-240 2.2.4(b)." ^{2/} Accordingly, of 84 items written up by the inspectors on N 8405H, 64 were reinspected by an inspector.

During the public hearing company policies, procedures, and their basis surrounding the inspection of all access panels and plates were fully explored. As already indicated, these items included the leading edges of the Convair and it was learned that ascertaining that these items were "in place and secure" was not an inspector's responsibility. It was, however, considered an inspection function delegated to the lead mechanic.

Several reasons were given for delegation of the responsibility to the lead mechanic. The reasons dated back several years to an incident following which this responsibility was re-evaluated. It was learned that before assigning the responsibility a test was made in the nature of a time and workload study. The test consisted of having lead mechanics perform the subject inspection. It was determined at that time the function could be done quickly and adequately by the lead mechanic. It was also felt by supervisory personnel that it fitted into the lead mechanic's workload without apparent difficulties and that both the inspector and lead mechanic were equally qualified to do the task. The delegation was then disseminated through shift foremen to all lead mechanics and incorporated in written procedures. Company personnel stated that this assignment had worked well for the intervening years prior to the accident and no complaints had been

2/ 2.2.4 Numbered Check Work Record Form CM-25. Recording Procedure.

(b) Whenever it is necessary to disconnect lines, cables, electrical connections, etc., or remove components, etc., to make repairs and/or adjustments during the course of accomplishing any numbered check on the engines or aircraft, the Mechanic will enter such item/s on the Work Record Form and sign off the item on completion. The purpose of such recording is to provide a complete history of all work operations. All such items are to be re-inspected and signed off by an Inspector.

registered through supervisory personnel concerning the delegation. Company supervisory personnel said, in summary, that it was felt the job was by no means downgraded in importance but it was simply a matter of selecting in their minds the proper person for the job, considering all factors. The CAA air carrier maintenance inspector assigned to the carrier stated he was aware of the procedure and was in concurrence with it.

Reviewing the work records of the maintenance performed on N 8405H during February 12 and 13 it was noted that one work record form used was not the latest card. The card had been revised and, according to the company, the older card should not have been used. In another instance the Master Work Record Form used was for the DC-6B. This form, however, had been made suitable for the Convair by striking the inapplicable items and by adding applicable ones. One applicable item, although it had no bearing on this accident, was nevertheless omitted. A company witness stated this form was used probably because the Convair form was in reprint and temporarily out of supply. Other than the above discrepancies the paper work covering the No. 3 heavy check was in good order.

Western Air Lines' standards of experience and qualifications for maintenance personnel are high. An applicant for employment in the maintenance section must possess a CAA mechanic certificate with a current airframe or powerplant rating. If his duties are to be in line maintenance or as a member of a heavy check crew and the employee has only one of the ratings he must obtain the other within a reasonable period. Company policy establishes the same experience and qualification requirements for the inspector and lead mechanic positions and the positions are of equal status in the personnel structure.

All heavy maintenance inspections are scheduled and performed at the carrier's Los Angeles facilities. All airframe, engine, propeller, and instrument overhauls are accomplished there. At Seattle the company performs turnaround and No. 1 checks on its DC-6 equipment and the same checks are accomplished on the Convair at Denver. In the event an unscheduled engine change or other major work is required at an outlying station, personnel from Los Angeles are sent to do the work.

The maintenance hangar and shops of Western at Los Angeles are maintained in a clean and orderly condition. They are well lighted, both day and night, with extension lights and floodlights available. The maintenance docks are permanently mounted in the hangars, with sufficient ladders and work stands provided. The various shops have necessary test stands and special tools, and both these tools and those belonging to the individual mechanics are adequate in quantity and quality to ensure good work.

Analysis

Prior to the origination of Flight 12 the pilots performed a preflight inspection of the aircraft. The description of this function by the pilots was, in the Board's view, in accordance with the company procedures and would have revealed such discrepancies as normally expected from the pilots' walkaround. The Board is well aware that the pilot preflight is not a maintenance function nor is it by nature and purpose a "screw by screw" check of an aircraft.

When Flight 19 reached about 500 feet above the ground immediately following takeoff the pilots heard a sharp report which was immediately followed by severe control difficulty. The problem manifested itself as severe vibration,

buffeting, and difficulty in raising the nose of the airplane.

As shown by a preponderance of clear evidence, the difficulty was caused by an inflight separation of the right wing leading edge section, normally installed between the right engine nacelle and fuselage. The control difficulty is compatible with the disruption of normal airflow over the right airfoil after the leading edge section separated. Undoubtedly normal lift was affected and a turbulent abnormal slipstream was introduced to the horizontal stabilizer and elevator control surface. It is also apparent that the section of leading edge skin which remained attached to the hinge blew back and forth in the slipstream. This most likely aggravated the disruption of airflow and produced a spoiler effect on the right wing. In the judgment of the pilots, which seems entirely reasonable to the Board, the severity of the control problem necessitated an immediate emergency landing.

Examination of the leading edge disclosed no evidence which would indicate that the screws used to retain the leading edge were in place at the time of the accident. There were no stripped threads in the self-locking nuts, there were no sheared screws in the nuts, and there was no other evidence which would show the screws had pulled out.

Examination of the leading edge screw holes exhibited no indication of abnormal elongation, scratches, and marks which would be expected if some of the screws had vibrated loose allowing the leading edge to "work" or "balloon" against remaining screws. If the proper screws had been installed they would not have worked out and if shorter screws had been used it is extremely improbable that all 27 screws would work out evenly at the same time. Even in this situation evidence would have been present on the edges of the screw holes or on the self-locking nuts. On the contrary, the screw holes and the 21 nuts recovered were in good condition. Therefore, after careful consideration, it is the opinion of the Board that the mechanic assigned to close the leading edge opening forgot to install the screws. It is obvious that he did install the gap straps which held the leading edge in place for about two hours of flight time before they failed under loads which exceeded their design limits.

The Board can neither justify nor excuse the manner in which the lead mechanic carried out his responsibility of inspecting the access panels for being "in place and secured." Considering that he was an expert in aviation maintenance, and the responsibility was clearly expressed in company material, its importance should have been evident to him. The Board is of the opinion that only a close and detailed inspection of each panel could satisfy the responsibility as it was expressed. The method of inspection of the aircraft, according to the lead mechanic's description, could not have assured him that screws were installed in the leading edge. From all the evidence, the Board is convinced that the lead mechanic treated the inspection in a cursory manner and as if there was an inadequate appreciation for its importance.

It is obvious that the inspection for proper closing and security of the access panels is an important airworthiness function and the responsibility for it must be placed in the proper person. That individual must be selected considering such tangible factors as qualification and experience as well as his other duties and overall workload. From the evidence presented it is apparent that all these factors were considered before the inspection assignment was made.

Nevertheless, there are other factors which the Board believes are worthy of consideration or reconsideration. In order to provide an efficient and smooth working maintenance organization a definite distinction is normally made between the responsibilities and duties of the production and inspection phases of air carrier maintenance. One of the primary concerns of the production group is the expeditious completion of all maintenance on each aircraft involved and its return to service. In this operation quality is expected; however, the early completion of the work scheduled is paramount. On the other hand, the primary concern of the inspection group is quality control relative to workmanship of the maintenance group and the airworthiness of the aircraft before its return to service.

In general, Western Air Lines has followed this concept; however, the division of responsibilities is not sharply drawn within the structure of the maintenance organization. According to WAL maintenance manual all airworthiness items must be "Red Lined" which requires reinspection by an inspector.

Obviously, the portion of the wing leading edge which separated in flight is critically related to the airworthiness of the aircraft. Despite this, the inspection responsibility was delegated to the production group.

The importance of maintaining a distinct separation between production and inspection is well illustrated by the testimony of the lead mechanic who performed the inspection in this instance. In essence, he said that reliance should be placed on the working mechanic to do uncomplicated work without the necessity of his inspection. While many may consider this view to be an individual's viewpoint, the Board believes it may be a consideration which should be reviewed by the company before delegating any inspection responsibility to production personnel.

Civil Air Regulations, Parts 18 and 40, state the requirements to be met in air carrier maintenance. These regulations require that an inspection department be maintained within the maintenance structure; however, considerable latitude is allowed so that each carrier may have flexibility in its specific maintenance structure according to the many variable needs and considerations in air carrier operations.

Findings

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

1. The carrier, crew, and aircraft were currently certificated.
2. At Los Angeles, prior to Flight 12, the pilots made a walkaround inspection in accordance with company procedures.
3. Flight 12 and Flight 19, until the Palm Springs departure, were uneventful and except for a lateral "out of trim" condition the aircraft operated normally.
4. During the departure from Palm Springs the right wing leading edge separated in flight.

5. Separation of the component resulted in severe control difficulty and buffeting of the aircraft.

6. A gear-down emergency landing was made in the boulder-strewn desert about four miles north-northwest of the airport.

7. During the ground roll impacts with the boulders caused severe damage and breakup of the aircraft, and a fire in the left wing spread rapidly and destroyed the aircraft.

8. N 8405H received a No. 3, areas 1 and 3, heavy maintenance check about two hours of flying time before the accident.

9. During the maintenance a mechanic assigned to close and secure the right leading edge forgot to install the retaining screws.

10. The gap straps were properly installed.

11. An inadequate inspection of the aircraft by the lead mechanic resulted in his failure to detect the omission.

12. The gap straps held the leading edge in place until the Palm Springs departure when they failed from loads beyond their design strength.

Probable Cause

The Board determines that the probable cause of this accident was the failure of a mechanic to secure properly the right wing leading edge section as a result of which the unit separated in flight. This improper installation was undetected because of inadequate inspection.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ G. JOSEPH MINETTI

/s/ LOUIS J. HECTOR

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

Investigation and Hearing

The Civil Aeronautics Board was notified of the accident at 1440 February 13, 1958, approximately an hour following the occurrence. An investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. A public hearing was ordered by the Board and held in the Hollywood Roosevelt Hotel, Hollywood, California, March 28, 1958.

Air Carrier

Western Air Lines, Inc., is a scheduled air carrier incorporated under the laws of the State of Delaware. Its principal offices are located in Los Angeles, California. The carrier 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 Civil Aeronautics Administration. These authorize the company to transport by air persons, property, and mail between various points in the United States including the route over which the accident occurred.

Flight Personnel

Captain Richard E. Schumacher, age 40, held a currently effective airman certificate with an airline transport rating and rating for the subject aircraft. He was employed by the company on February 23, 1945. At the time of the accident he had a total of 9,845 flying hours, of which 3,547 were in the Convair 240. His latest medical examination was satisfactorily completed, without waiver, on December 18, 1957.

First Officer James R. LeBel, age 31, was employed September 7, 1954. He held a currently effective airman certificate with airline transport rating. First Officer LeBel, at the time of the accident, had accumulated 5,240 flying hours, with 785 in the Convair 240. His latest medical certificate was dated March 5, 1957.

Stewardess Barbara F. Grimes, age 24, was employed as a stewardess on July 8, 1957, following the satisfactory completion of training. This training included emergency procedures on the aircraft utilized by the carrier.

The Aircraft

N 8405H, a Convair 240, was manufactured December 23, 1948, bearing serial number 22, and delivered to Western Air Lines in 1948. From date of manufacture until the accident the aircraft had accumulated a total of 22,516 hours. It was currently certificated by the Civil Aeronautics Administration. At the time of the accident the aircraft was equipped with nearly new Pratt and Whitney model R-2800-CB-16 engines. The propellers were Hamilton Standard 43E60-7 with model 6895A-12 blades.