

AIRCRAFT ACCIDENT REPORT

ADOPTED: May 13, 1964

RELEASED: May 20, 1964

MOHAWK AIRLINES, INC.
MARTIN 404, N449A
ROCHESTER-MONROE COUNTY AIRPORT
ROCHESTER, NEW YORK
JULY 2, 1963

SYNOPSIS

A Mohawk Airlines, Inc., Martin 404, N449A, operating as Flight 112 from Rochester, New York, to Newark, New Jersey, crashed on the Rochester-Monroe County Airport July 2, 1963, at approximately 1649 e d t. Seven of the forty-three persons aboard, including both pilots, were fatally injured

Flight 112 commenced a takeoff on runway 28 as a thunderstorm approaching from the west-northwest, moved over the takeoff runway. After becoming airborne and almost immediately after entering heavy rain and shifting wind conditions, the left wing of the aircraft made contact with the ground. In the ensuing cartwheel to a stop, the aircraft was destroyed by impact and fire.

The Board determines that the probable cause of this accident was a loss of control during an attempted takeoff into a severe thunderstorm

Investigation

Mohawk Airlines, Inc., Flight 112, a Martin 404, N449A, a scheduled passenger flight from Rochester, New York, to White Plains, New York, crashed at approximately 1649 e d t ^{1/} on July 2, 1963. A takeoff was attempted from the Rochester-Monroe County Airport in a severe thunderstorm. Seven of the forty-three persons aboard, including Captain Dennis and First Officer Neff, were fatally injured. This crew flew earlier in the day in an aircraft which was not involved in this accident. Also, this crew flew under different flight numbers and stopped at various Mohawk stations. Due to the importance of the day's happenings throughout the Mohawk Airlines system, mention is made of relevant occurrences in a sequential order. Starting with the initial item of significance, the flight crew and stewardess had departed Buffalo, New York, at 1238, in another aircraft operated as Mohawk Flight 204, arriving at Ithaca, New York at 1308. After a short layover this crew was to fly aircraft N449A from Ithaca to Rochester as the last segment of Flight 115.

At approximately 1330, Flight 115 (N449A) departed New York City with another

^{1/} All times herein are Eastern daylight based on the 24-hour clock.

crew en route to Ithaca. At 1340, the Dispatch Office of Mohawk Airlines 2/ sent a teletype flight message to Ithaca for the last segment of Flight 115 from Ithaca.

In compliance with instructions contained in the flight release message sent from the dispatcher, a Mohawk Customer Service Agent at Ithaca prepared a flight plan release 3/ for the last segment of Flight 115. The flight plan release was signed in Ithaca at 1355. The Ithaca agent testified that he placed the 1400 Service A 4/ weather sequence, the latest terminal weather forecast, and the flight plan release on the operations counter. A 1400 Service A weather sequence was found in the aircraft wreckage with a flight plan release, no other weather documents were found.

At 1415, an aviation severe weather forecast was issued by the U. S. Weather Bureau's severe local storms unit 5/ at Kansas City, Missouri. The Cleveland

2/ The Dispatch Office of Mohawk Airlines is located at Utica, New York. This central office provides dispatching services for the entire Mohawk system. The Dispatch Office was staffed on a 24-hour basis in three 8-hour shifts. There was a total of 5 certificated dispatchers and 6 clerk/flight-followers employed. Under peak operating conditions two dispatchers were assigned to each shift. One dispatcher handled east-west flights, the other, north-south flights. A clerk/flight-follower assisted each dispatcher. Personnel not certificated as dispatchers were delegated responsibility for certain functions of dispatching at each of Mohawk outlying stations. These delegated functions included dissemination of weather information and signing of the flight plan release form. The personnel authorized to perform these functions were titled "Customer Service Agents." To qualify as a Customer Service Agent required no previous aeronautical experience; however, before performing operational functions the Customer Service Agents were required to pass written examinations prepared by the Mohawk Training Department. There was no reexamination or recurrent formal training of any kind for Customer Service Agents after original qualification. Mohawk Airlines was not able to produce the examinations taken by the Rochester station personnel, however, at the public hearing a series of questions was submitted, for the record, which was represented to be a copy of the standard examination for qualifying Customer Service Agents.

3/ The Mohawk Operations Manual Page O3-04:02 states. "A release is valid authorization to undertake flight. . . when an authentic copy has been transmitted via PLT (private line teletype) or telpak to each authorized station employee, signed by that employee and the captain. . . The dispatch release shall contain or have attached thereto weather reports, available weather forecasts, or a combination thereof, for the destination, intermediate stops, and alternates specified therein which shall be the latest available at the time the release is signed by the pilot-in-command and dispatcher . . ."

4/ Service A is a teletype circuit which is used to collect and disseminate weather information. Mohawk had Service A facilities at Ithaca and Utica but not at Rochester.

5/ The Severe Local Storms (SELS) center, a unit of the United States Weather Bureau is responsible nationally for forecasting weather such as tornadoes, severe thunderstorms, etc.

U.S.W.B Office 6/ then issued SIGMET 7/No 1 at 1430 amending the existing area forecast to conform to the Severe Weather Forecast. The SIGMET, valid from 1430 to 1830 read in part. " a few severe thunderstorms or isolated tornado in Western New York east of a Buffalo, New York-Williamsport line Locally severe turbulence in thunderstorms and chance of extreme turbulence. Hail of 1-1/2 inches diameter, surface wind gusts to 65 knots in severe thunderstorms. . "

Shortly thereafter, the SIGMET was disseminated over Service A weather teletype. At 1445, the Cleveland Office issued an amended Rochester terminal forecast valid from 1445 to 0100 which mentioned "scattered thunderstorms and a chance of isolated tornadoes " The Mohawk Dispatch Office sent the following teletype message to all Mohawk stations at 1453.

"Post for pilots and pass to any flight into areas mentioned. Weather Bureau Severe Weather Forecast indicates along and 60 miles either side from 60 southeast Buffalo to 50 miles northeast Batavia, scattered severe thunderstorms in extreme turbulence Hail to 1-1/2 inches in diameter and maximum surface gusts 65 knots. Possibility an isolated tornado or two. Squall line forming in Ontario to vicinity Buffalo and Youngstown Expected to intensify and move eastward at 40 knots. Company Pireps indicate a line of thunderstorms through Western Pennsylvania from north of Johnstown extending southeastward and building rapidly Expect these thunderstorms to move eastward."

At 1455 Flight 115, N 449A, arrived at Ithaca from New York. The captain of the aircraft then advised Captain Dennis 8/, the pilot assigned to the segment from Ithaca to Rochester on Flight 115, of a squall line approximately 75 to 80 miles northeast of Ithaca and that "it looked pretty bad " The incoming captain testified that he had no prior notification of thunderstorm activity, but after hearing an en route aircraft ahead of him request a rerouting to circumnavigate thunderstorms, he observed the squall line on aircraft radar. He also stated that N 449A operated normally during the flight from New York to Ithaca.

Flight 115 departed Ithaca at 1508. Neither a copy of the flight plan release nor copies of the required weather documents were retained in the Ithaca station file. 9/

6/ The Cleveland, Ohio Office is responsible for forecasting the weather in an area encompassing the northern third of Ohio, Western Pennsylvania, and Western New York. Rochester, New York is in their area of responsibility

7/ A SIGMET is a message designed primarily for aircraft in flight, warning of weather conditions potentially hazardous to transport category (and other) aircraft.

8/ Oncoming crew members were Captain Richard M Dennis, First Officer John W. Neff, and Stewardess Mary Ann Miara.

9/ Mohawk Airlines Operations Manual 03-04:06 states "All releases shall be prepared in duplicate with the signatures appearing on both copies. Stations shall maintain a copy of each attachment furnished a flight . File copies of all releases shall be kept for a period of three months."

Shortly after Flight 115 departed Ithaca, Mohawk Flight 186 departed Toronto, Canada, en route to Buffalo, New York. The pilot of Flight 186 observed a line of moderate precipitation returns "with solid cores" on his radar. This weather was northwest of Buffalo. Flight 186 passed this line of weather five miles west of the Grimsby Ontario Intersection on a due south heading. The pilot of Flight 186 said that 20-25 miles west of Buffalo, he was paralleling an enormous return that almost filled up the entire left side of the radar scope on the 30-mile range. Buffalo Approach Control confirmed this return and mentioned a pilot report of "tops over 50,000 feet". At approximately 1545, the pilot of Flight 186 reported these storms to the company radio operator at Utica. Receipt of the message was acknowledged.

Flight 115 arrived at Rochester at 1542 where it terminated. The flight from Ithaca to Rochester was routine. After a one-hour layover the crew was to originate Flight 112 scheduled to depart Rochester at 1645, in N 449A.

At 1545 a Mohawk Dispatcher sent the flight release message for Flight 112 to Rochester. Upon receipt of the message at Rochester, a Mohawk Customer Service Agent completed the flight plan release for the captain's signature.

The aircraft was serviced with fuel and no maintenance repairs were performed at Rochester.

The computed weight and balance of N 449A at liftoff was later determined to have been within allowable limits.

At 1600, the pilot of Flight 186, on the ground at Buffalo, telephoned the Utica Dispatch Office to discuss the severity of the storms he had reported at 1545. ^{1C/} The Mohawk Dispatch Office had not received the 1545 message. A transcript of the radio log of the Mohawk Utica communication station indicates that the message was received by the radio operator between 1535 and 1540. Mohawk stations were connected with the dispatch office by a private line teletype circuit. Operational information and special company weather bulletins were also sent over this circuit. Inflight aircraft of Mohawk Airlines could be contacted via company radio.

The Rochester station was equipped with private line teletype, and telephone to the Utica Dispatch Office; however, it did not have Service A weather facilities. Mohawk Rochester personnel obtained the U. S. Weather Bureau reports and forecasts from United Air Lines on an informal, gratuitous basis. Extra copies were made on United Air Lines' duplicating facilities. When duplication was not possible long-hand copies were sometimes made by Mohawk personnel. There was no contractual arrangement between United Air Lines and Mohawk Airlines covering this weather service at the time of the accident and no responsibility existed on the part of United Air Lines to provide weather information to Mohawk.

A Mohawk Customer Service Agent collected weather data from United Air Lines at about 1610, and said he placed the flight documents on the counter in the operations office for the captain's examination and signature. The agent said that

^{1C/} Mohawk Airlines used telephone and teletype for communication between the Utica Dispatch Office and outlying stations. The Dispatch Office was equipped with four telephone lines which connect the dispatch office and the forty-odd outlying stations.

the documents included the local 1600 sequence report obtained from United Air Lines, the 1453 company weather warning, the flight plan release form and the 1545 dispatch release message. Not included were the 1415 aviation severe weather forecast, the 1430 SIGMET, or the 1445 amended Rochester terminal forecast. There is no evidence that the captain examined the documents, but there is testimony that they were not brought to his attention. No weather documents were attached to the flight plan release form for Flight 112 and there were no file copies of the dispatch documents retained at Rochester.

Continuing the chronology of events, the stewardess of Flight 112 boarded the aircraft at approximately 1615. In recounting her observation of weather conditions at that time, she indicated that it was windy but there was no lightning, hail, or rain. Shortly after 1630, the flight crew boarded the aircraft. At approximately 1640, the passengers boarded the aircraft. It was not raining at that time but a storm was approaching. Typical comments from passengers at the hearing were "There was a stiff breeze blowing...there was thunder and lightning..." Ground witnesses agreed. The stewardess stated "While the agent was changing his papers 11/ I heard thunder. I made some motion to him that it was thundering so loud." Corroboration of meteorological conditions was supplied by Weather Bureau records which indicated that the Rochester Weather Observer heard thunder at 1640, and recorded the beginning of a thunderstorm at that time.

The engines of Flight 112 were started about the time the last passenger boarded the aircraft. The Customer Service Agent and the stewardess observed the captain occupying the right seat in the pilot's compartment 12/ Before departing from the gate at 1645, Flight 112 established radio contact with the FAA Rochester Tower Ground Controller who cleared the aircraft to runway 28 13/

The Customer Service Agent testified "As the flight left the gate, from the north and northwest you could see a quite voluminous buildup and it was quite dark. As the flight started to roll, a little rain was hitting the ramp." He said "I don't recollect any (lightning) until he was out on the taxiway and in a run-up position and I believe there was some lightning then."

As flight 112 taxied out, American 453 commenced a takeoff on runway 28. The departure clearance given the American flight to avoid the approaching storm was initiated by the radar departure controller.

At approximately 1646, the Rochester Ground Controller transmitted an air traffic control clearance to Flight 112 and instructed the flight to "Maintain departure heading for vectors to Victor 34." The clearance was acknowledged.

11/ A last minute substitution of a revenue passenger was made to replace a nonrevenue passenger already on board the aircraft

12/ The Mohawk Airlines Operations Manual Page 13 05:01 relative to placing the first officer in the left seat states "Captains must have a minimum of 250 hours command time in that aircraft type. First Officers must have 24 active months service as a pilot with Mohawk Airlines and 900 total hours in Mohawk Convairst." This requirement also applied to Martin 404 aircraft according to testimony of company officials.

13/ Runway 28 has a concrete surface and is 5,500 feet long and 150 feet wide

As the aircraft neared the takeoff runway it was braked to a stop. Passengers stated that it was raining hard; that hail was hitting the aircraft; the windshield wipers were on; that there was no engine runup prior to takeoff, and that the wind was strong and gusty. The local weather observer noted wind gusts of 40 knots at 1647.

A groundwitness in an automobile on the airport service road stated, "As I approached runway 28 I saw the Mohawk flight moving along the taxi strip toward the end of 28. The plane came to a halt at the end of the strip and stood for approximately 30 seconds. I stopped my car to observe the flight as the weather looked very bad to the north of runway 28. To the southwest and east, the sky was overcast, but light with the ceiling possibly 3,000 feet. Overhead it looked like the underside of a thunderhead - very black and ominous. During the above period it was raining quite hard."

At approximately 1648, a crew member advised the tower that Flight 112 was ready for takeoff. The local controller coordinated the release with the radar departure controller and then cleared the flight for takeoff. The crew advised the tower that they "would like to make a left turn out as soon as possible to avoid those thunderstorms approaching from the west." The local controller conveyed this request to the radar departure controller who replied "Give him a left turn on course." The local controller relayed this information to Flight 112 and said "The wind at the moment is 340 (degrees) velocity 15 (knots)." The crew replied "Okay we'll make a left turn out right away." This was the last communication from the aircraft.

Flight 112 commenced its takeoff at approximately 1649. The previously mentioned witness near the approach end of runway 28 described the takeoff as follows: "The flight rolled into takeoff position and started down the runway. I am quite certain that the runway lights were on. As the flight passed the third or fourth runway light it disappeared into a torrential downpour. I could still see the rotating beacon on the plane. It continued in a straight line and disappeared in a few seconds."

The time of takeoff was 1649, as recorded in the Rochester control tower. Passengers were in agreement that the copilot, in the left seat, manipulated the controls during the takeoff run and liftoff; that as the aircraft gained altitude it entered a "wall of rain"; that upon entry, and as the left wing dropped the captain also began to manipulate the controls; that the aircraft then leveled out; that buffeting followed, and the right wing dropped. The aircraft was righted but shortly thereafter the left wing dropped and the aircraft made contact with the ground.

Control tower personnel observed the aircraft emerge from the precipitation area in an extreme right wing-down nose-high attitude. The right wing tip was approximately 25 feet above the ground. Upon seeing the aircraft in this attitude, with the underside of the wings visible, the Rochester Ground Controller shouted "Hit the siren." The local controller responded and one siren near the tower sounded. Control tower personnel then observed the aircraft to right itself and cross the intersection of the north-south east-west runways in what seemed to them to be a normal attitude. As one controller stated "Then he seemed to climb slightly and fell off on the left and fell to the ground."

At 1644, prior to Mohawk Flight 112 departure from the ramp, the siren on the fire house at the south ramp sounded. The crash equipment responded but upon being advised by the ground controller that the tower had not activated the siren, it was agreed that lightning must have struck the telephone wires and set it off. The crash equipment was returned to its quarters at 1648.

When the siren near the tower sounded the local Weather Bureau Observer was looking at the transmissometer graph to check on his visual measurement of existing visibility. While this instrument had not been formally commissioned it was recording a transmissivity which can be converted by reference to tables into runway visibility. This observer did not assess a visibility value to the transmissometer data at that time. The observer then called the control tower to inquire why the siren had sounded and was informed of the accident. At the same time he checked with the tower controller and both agreed that the visibility was then one-half mile. The Weather Bureau Observer continued taking the observation for a special report. As he walked outside he noted rain and 1/2 inch hail. He observed the wind to be east-southeast at approximately the same time Mohawk Flight 112 struck the ground. The special observation was completed at 1652. At 1649 the tower, by telephone, advised the Fire Department that Mohawk had crashed. Fire and crash equipment previously alerted by the spurious signal responded immediately. At 1651, the equipment was on the scene and by 1653 the fire was under control.

The aircraft contacted the ground 220 feet south of the centerline and 4,668 feet from the threshold of runway 28, and it came to rest 566 feet south of the centerline and 5,022 feet from the threshold of runway 28.

Contact with the ground was first made by the left wing tip. The aircraft then began to disintegrate in a left curving turn (see Attachment 1), cartwheeling, and came to rest on a magnetic heading of 280° in a drainage excavation approximately 6 feet deep adjacent to the takeoff runway. The aft section of the fuselage with empennage attached fractured around the circumference immediately behind the wing rear spar, pivoting approximately 90° coming to a stop in virtually an upright position against the remaining portion of the left wing and engine nacelle. The forward section was reduced to a mass of torn, twisted, and compressed metal. The center section remained intact and attached to the center wing panel, sustaining only interior damage. During and following the principal impact, all 20 double passenger seats were torn free from their attachments. Most seats were thrown free of the wreckage. Both engines were torn free of the aircraft and were relatively intact. The propeller ground slash marks indicated that all propeller blades were intact prior to impact. Test of the propeller governors indicated that the engine RPM at impact were 2760 and 2830 for the left and right engines, respectively. Rated takeoff RPM is 2800. Propeller shim plate impact markings indicated that the left propeller blade angle was 34 degrees, and the right propeller blade angle was 33 degrees. Propeller performance data indicated that at this blade angle and RPM, the left propeller would have been absorbing 2440 BHP at 90 knots, and 2380 BHP at 100 knots. Similarly the right propeller power absorption would have been 2440 and 2360 BHP at these airspeeds, respectively. Wet rated takeoff power for this engine is 2400 BHP. Using left powerplant data as more representative because of impact conditions, the groundspeed at impact was calculated to be 92 knots.

An examination of the aircraft's systems revealed no evidence of failure or malfunction prior to impact. However, all switches on the pilot's circuit breaker panel were found in the OFF position as were eight heavy type breaker switches on the main distribution panel. The checkoff scroll was found at the pre-takeoff position.

A review of the employment record of the captain reveals that he had been involved in a wheels-up landing accident and as a result thereof he was demoted to copilot for six months. Also, he was involved in an in-flight propeller reversal incident. The captain was reprimanded on at least two occasions for infraction of company rules.

On January 5, 1963, the captain was given a combination type rating and proficiency flight check. The check was discontinued after 2:20 hours because of weather and darkness. On January 8 the check was resumed for an additional 1:15 hours. Mohawk elected to consider the two flight checks as separate. Company records indicate Captain Dennis failed the January 5 check given by that company checkpilot, but passed the January 8 test given by another Mohawk checkpilot. There was some evidence that the checkpilot who passed Captain Dennis on January 8 was later censured for his action, and was no longer employed by Mohawk at the time of the public hearing.

Testimony adduced at the public hearing regarding the captain's proficiency was confusing. The Acting Director of Flying who rode as company checkpilot on January 5, and a Vice President of Mohawk considered the captain to be below average. The checkpilot who passed him on January 8 testified at the public hearing that he believed him to be a "hazard." At the time of the hearing this checkpilot was not employed by Mohawk. The Federal Aviation Agency Inspector who rode on both checks characterized him as being "a good pilot." Federal Aviation Agency airman records indicated that the captain had met all the requirements for an airline transport rating and was currently qualified.

Analysis

The investigation revealed no evidence of control system, powerplants or structural failure. The forces to which the aircraft was subjected when it struck the ground and then cartwheeled, undoubtedly caused the extensive breakup of the structure.

The Mohawk Dispatch Organization depended on a relay of information between the company radio room and the dispatch office. A pilot report of severe weather was transmitted to Mohawk company radio but this report did not reach the Mohawk Dispatch Office. This is indicative of a lack of procedures to insure the relay of information to personnel charged with the initial responsibility of dispatching flights.

When Captain Dennis departed Ithaca at 1508, the Mohawk Dispatch Office at Utica and the Ithaca station, both equipped with Service A weather teletype facilities, should have received the 1415 aviation severe weather forecast, the 1430 SIGMET, and the 1445 amended Rochester terminal forecast. In addition, the Ithaca station should have received the 1453 weather message sent from the Utica Dispatch Office. The 1400 Service A weather sequence and the Ithaca flight plan release

were found in the aircraft wreckage; however, no terminal forecast, SIGMET, area forecast, Mohawk weather message, or other weather documents were found. When this fact is compared with the testimony of the Ithaca Customer Service Agent that these documents were not given the flight, it appears that Mohawk Airlines did not properly dispatch Flight 115 from Ithaca to Rochester.

The Customer Service Agent at Rochester placed the flight documents on the operations office desk for the captain's signature. The weather documents reportedly included the 1600 Service A sequence report and the 1453 Mohawk weather message. Not included were the 1415 aviation severe weather forecast, the 1430 SIGMET, or the 1445 amended Rochester terminal forecast. These documents were available at United Air Lines. The failure to provide this weather information is contrary to the provisions of the Civil Air Regulations^{14/} in the dispatch of Flight 112 from Rochester.

In the dispatching of Flights 115 and 112 from Ithaca and Rochester the latest available weather forecasts were not provided and were not attached to the dispatch release form. This was contrary to the Company's Operations Manual and the Civil Air Regulations.^{15/} Copies of the dispatch documents and attachments were not found in the Ithaca or Rochester station files, nor were copies of the Rochester dispatch documents found in the wrecked airplane, leading to the conclusion that Captain Dennis was not given a copy. This procedure appears to be contrary to the Company's Operations Manual^{16/} and the Civil Air Regulations.^{17/} However, the Federal Aviation Agency Air Carrier Inspector assigned to Mohawk explained that the company maintained

^{14/} CAR 40.35 states "The air carrier shall show that sufficient weather reporting services are available along the route to insure weather reports and forecasts necessary for the operation. Forecasts used to control flight movements shall be prepared from weather reports furnished in accordance with paragraphs (a) and (b) of this section as appropriate. (a) For operations within the continental limits of the United States, weather reports used to control flight movements shall be those prepared by the United States Weather Bureau, or by a source approved by the Weather Bureau. . . ."

^{15/} CAR 40.503(b) states "The dispatch release shall contain, or have attached thereto, weather reports, available weather forecasts, or a combination thereof, for the destination, intermediate stops, and alternates specified therein which shall be the latest available at the time the dispatch release is signed by the pilot-in-command and the dispatcher. It shall include such additional weather reports and forecasts, as available, considered necessary or desirable by the pilot-in-command and the aircraft dispatcher."

^{16/} Mohawk Airlines Operations Manual 03:04:06 states as follows: "All releases shall be prepared in duplicate and with signatures appearing on both copies. Station shall maintain a copy of each attachment furnished a flight. . . File copies of all releases shall be kept for a period of three months."

^{17/} CAR 40.505 states "Copies of the completed load manifest, or information therefrom except with respect to cargo and passenger distribution, the dispatch release form, and the flight plan shall be in the possession of the pilot-in-command and shall be carried in the airplane to its destination. . . ."

a complete file at their headquarters which was "substantial compliance with the regulation." Since the flight crews do not commence all flights at company headquarters this method of dispatching does not insure the traveling public that the Mohawk flight crews will receive all available and required weather information prior to commencing flights.

The authority to sign a release is specifically placed in the captain and the aircraft dispatcher. Any delegation of this authority must originate or emanate from the possessor of that authority.^{18/} In this instance there was no proper delegation of authority from an aircraft dispatcher to an authorized Rochester station employee. To properly accomplish the delegated functions, the Customer Service Agent should have performed certain essential services in addition to the single act of signing the release form. He was required to prepare the flight plan release form and supply copies of the weather reports and forecasts which would apprise the pilot of anticipated weather conditions en route, at the destination and the alternate. This required knowledge as to the identity and number of weather documents to be attached to the flight release, the schedules, and sources of this information. It also required the ability to identify the latest document by time and date and a general appraisal of content to insure that all available information relative to the operational safety of the flight had been supplied the captain by every means possible.

Since Customer Service Agents had little, if any, previous operational experience, Mohawk Airlines attempted to qualify them by examination. This was proper and in accordance with existing requirements.

The examination was prepared by the Training Department but there was no coordination with, or review by, the Mohawk Dispatch Office. The sample examination was deficient in content and scope. As an example, while the examination is titled "A Qualification Examination for Authority to Sign Release Forms," only three of the eleven questions had even a remote bearing on the subject matter. There was nothing in the examination which would assure that the examinee had been trained in or was familiar with information regarding local weather reports, forecasts, notices to airmen, or the required attachments to the flight plan release form.

A grade of 100 percent in the examination would not insure that the examinee could identify a sequence weather report, a terminal forecast, an area forecast, or a SIGMET, or would know where to secure this information. Such an examination should include the philosophy for delegation of authority, the working tools, and the mechanics for performance.

The insufficiency of the qualifying examination and the resultant performance of Customer Service Agents can be attributed, in a large measure, to the company's organizational structure which insulated the dispatch office from supervision of the Customer Service Agent's performance. The Customer Service Agent performed in behalf of but was not responsible, in the chain of command, to the dispatch office. As a result of this, the dispatchers at Utica could not or did not monitor the performance of Customer Service Agents acting in their behalf.

^{18/} CAR 40.411 states "A dispatch release shall be prepared for each flight between specified points from information furnished by the authorized aircraft dispatcher. This release shall be signed by the pilot-in-command and by the authorized aircraft dispatcher only when both believe the flight can be made with safety. The aircraft dispatcher may delegate authority to sign such release for a particular flight, but he shall not delegate the authority to dispatch."

The release message from the Utica dispatcher for Flight 112 was transmitted to the Rochester station at 1545, or one hour before departure. No attempt was made by the controlling dispatcher at Utica, after 1545, to reassess the worsening weather conditions and to convey this reappraisal of the situation to the captain before departure time. The Utica dispatcher should have made this reappraisal and should have checked with the captain to make sure he was fully aware of the severity and extent of the approaching weather.

At the time of the accident, a severe thunderstorm was in progress over the Rochester Airport. The thunderstorm moved over the field from the west-northwest accompanied by heavy rain, hail, wind gusts, and shifting winds as Flight 112 began its takeoff. After becoming airborne the aircraft entered heavy rain, severe turbulence, and strong down drafts. Shortly thereafter the aircraft encountered a wind shift of about 180 degrees from northwesterly (a headwind) to southeasterly (a tailwind). The northwesterly winds were approximately 20 knots with gusts in excess of 40 knots while the southeasterly winds were about 10-15 knots.

From an examination of the available evidence, the Board finds the Weather Bureau forecasts of weather conditions in the area, to have been accurate and the distribution proper and timely. The testimony revealed that the control tower, by Tel-Autograph, received a special weather observation from the Weather Bureau at 1645. This special report was not brought to the attention of the pilot. While we cannot be certain that the captain was supplied with any weather reports, the only element in the special weather observation which differed from the previous observation was the notation which indicated the beginning of a thunderstorm in Rochester at 1640. This thunderstorm must have been apparent to the captain when he commenced the takeoff.

Examining the Federal Aviation Agency's surveillance of Mohawk's operation, revealed that the air carrier inspectors applied a doctrine of "substantial compliance." The Board finds that the source and availability of weather information relied upon at Rochester, without formal agreement; the failure of the Rochester and Ithaca stations to prepare and maintain the required files, the failure of Customer Service Agents to meet the minimum requirements of the Mohawk Operations Manual and the Civil Air Regulations with regard to the preparation and distribution of weather and flight documents; to be specific examples of the failure of this doctrine to require the minimum standards of safety delineated in the Civil Air Regulations.

A dispatch release should be signed by the authorized aircraft dispatcher / only when he believes the flight can be made with safety. There is a joint responsibility in signing the dispatch release. The captain must also review the documents, analyze their contents, and independently determine that the particular flight can be made in safety. There is strong evidence that this was not done. Allowing the copilot to occupy the left seat on takeoff was contrary to the Mohawk Operations Manual in that the captain had insufficient pilot flight time in this type aircraft to permit it. The first officer also had insufficient service, according to the company manual, to occupy the left seat. Further evidence of noncompliance with the Company's Operations Manual is manifested in the failure of the crew to accomplish the company prescribed pre-takeoff checklist.

Prior to the takeoff Flight 112 asked for and was given a left turn out to avoid the approaching storm which indicates that the storm was known to the crew. When Flight 112 commenced its takeoff, the thunderstorm must have been apparent to the crew and its intensity should have been immediately apparent to a professional pilot. The failure of the captain to properly appraise the weather conditions and his attempted takeoff into a severe thunderstorm raises serious doubts as to his judgment.

Probable Cause

The Board determines that the probable cause of this accident was a loss of control during an attempted takeoff into a severe thunderstorm.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

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 this accident immediately after its occurrence on July 2, 1963. Investigators were dispatched immediately to the scene to conduct an investigation 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 Rochester-Sheraton Hotel, Rochester, New York, on August 20-23, 1963.

Air Carrier

Mohawk Airlines, Inc., a New York corporation with its principal office at Oneida County Airport, Utica, New York, holds a current certificate of public convenience and necessity issued by the Civil Aeronautics Board to engage in the transportation of persons, property, and mail. It also possesses a valid air carrier operating certificate issued by the Federal Aviation Agency.

Flight Personnel

Captain Richard M. Dennis, age 39, was employed by Mohawk Airlines on April 12, 1954, and had accumulated a total of 15,970 hours flight time, of which 444 hours were in Martin aircraft. He held a currently effective FAA air-line transport certificate No. 765432 with numerous ratings, among which was the Martin 404. His last proficiency check in Martin 404 aircraft was on January 8, 1963. His last line check in Martin 404 aircraft was April 10, 1963. Records indicate he satisfactorily passed a first-class FAA flight physical on June 1, 1963, with the following limitation: "Holder shall wear correcting lenses while exercising privileges of his airman certificate."

First Officer John W. Neff, age 31, was employed by Mohawk Airlines on September 20, 1961, and had accumulated a total of 3,439 hours. He had accumulated a total of 795 hours flight time in Martin 404 type aircraft. He held a currently effective FAA commercial pilot certificate No. 1365082 with aircraft single and multiengine land and instrument ratings. His last line check was in a Convair 240 aircraft on April 23, 1962. Transition training to Martin 404 aircraft was completed December 15, 1962. During this training period he received a total of 1:48 hours of flight time and 1:48 hours of observation time and was recommended for a type rating. His last proficiency check in Martin 404 aircraft was on March 16, 1963. Records indicate he satisfactorily passed a first-class FAA flight physical on April 24, 1963, without waivers.

Stewardess Mary Ann Miara was employed by Mohawk Airlines on January 14, 1963. She completed her training in emergency procedures on February 1, 1963, and had satisfactorily passed a company medical examination.

Aircraft

N449A, a Martin 404, manufacturer's serial number 14140 was owned by the Charlotte Aircraft Corporation, P. O. Box 9127, Charlotte 5, North Carolina. This aircraft was leased to Mohawk Airlines on June 6, 1963. The aircraft was manufactured on January 2, 1952, and had a total flying time of 29,817:58 hours.

e aircraft was powered by two Pratt & Whitney Double Wasp (R-2800) CB3 engines
th Hamilton Standard propellers. Engine times were as follows:

<u>Engine Position</u>	<u>Time Since Overhaul</u>	<u>Total Time</u>
1	482	21,518
2	999	20,941

RUNWAY 17

RUNWAY 10

RUNWAY 28

RUNWAY 1



ATTACHMENT #1

CIVIL AERONAUTICS BOARD

CRASH KINEMATICS

MOHAWK AIR LINES MARTIN M-404, N449A

ROCHESTER, NEW YORK, JULY 2, 1963

HUMAN FACTORS GROUP ILLUSTRATION drawn by AVSER