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16. Abstract About 2149 e.d.t., on June 21, 1978, at La Guardia Airport, Flushing, New York, E.S.M. Group, Inc., Cessna Citation, N51MW, almost collided with a North Central Airlines, Inc., DC-9-30, N957N, as the Cessna attempted to take off from runway 13. Shortly after the local controller had cleared the Cessna for takeoff, the DC-9, which had been cleared by the ground controller to taxi northwest on the active runway, turned on to runway 13. The pilot of the Cessna saw the DC-9, rejected the takeoff, steered his airplane off the runway, and avoided a collision. Although there were no injuries to the occupants of either aircraft and the DC-9 was not damaged, the Cessna was damaged slightly. Thunderstorms throughout New York Air Route Traffic Control Center's airspace had caused air traffic delays. Because of these delays the taxiways, ramps, and gates at La Guardia Airport were congested with aircraft. The National Transportation Safety Board determines the probable cause of the incident was the failure of the ground and local controller in the La Guardia tower to effect the required coordination before using the active runway for taxiing an aircraft. Also contributing to the incident was a coordination procedure which did not require the local controller to establish direct communication with the pilot of the aircraft before clearing him to use the active runway for extended taxi operations.					
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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT INCIDENT REPORT

Adopted: February 22, 1979

E.S.M. GROUP, INC., CESSNA CITATION, N51MW
NORTH CENTRAL AIRLINES, INC.
DC-9-30, N957N
LA GUARDIA AIRPORT, FLUSHING, NEW YORK
JUNE 21, 1978

SYNOPSIS

About 2149 e,d,t., on June 21, 1978, at La Guardia Airport, Flushing, New York, E.S.M. Group, Inc., Cessna Citation, N51MW, almost collided with a North Central Airlines, Inc., DC-9-30, N957N, as the Cessna attempted to take off from runway 13. Shortly after the local controller had cleared the Cessna for takeoff, the DC-9, which had been cleared by the ground controller to taxi northwest on the active runway, turned on to runway 13. The pilot of the Cessna saw the DC-9, rejected the takeoff, steered his airplane off the runway, and avoided a collision. Although there were no injuries to the occupants of either aircraft and the DC-9 was not damaged, the Cessna was damaged slightly. Thunderstorms throughout New York Air Route Traffic Control Center's airspace had caused air traffic delays. Because of these delays the taxiways, ramps, and gates at La Guardia Airport were congested with aircraft. .

The National Transportation Safety Board determines that the probable cause of the incident was the failure of the ground and local controllers in the La Guardia tower to effect the required coordination before using the active runway for taxiing an aircraft. Also contributing to the incident was a coordination procedure which did not require the local controller to establish direct communication with the pilot of the aircraft before clearing him to use the active runway for extended taxi operations.

1. FACTUAL INFORMATION

1.1 History of the Flight

Between 1800 and 2200 1/ on June 21, 1978, departures from La Guardia Airport, Flushing, New York, were being delayed up to 3 hrs 45 min by thunderstorm activity in or near the New York metropolitan area. During the 4-hour period there were up to 70 aircraft of various types on the La Guardia taxiways awaiting departure. According to one air carrier pilot, the congestion was so severe that it took 55 min to taxi his aircraft from the landing runway to the gate at the terminal. The La Guardia tower was using runway 22 for landings and runway 13 for takeoffs.

North Central Flight 57, a DC-9-30, had been scheduled to depart for Milwaukee, Wisconsin, at 1700. The flight had requested a Sloat standard instrument departure (SID) which routed it northwest of La Guardia to the Huguenot VORTAC. According to the captain, he taxied his aircraft from the gate about 1835.

About 2144, New York Center (NYARTCC) advised the ground controller that the Huguenot departures were released. At that time, the DC-9 was taxiing northwest on taxiway Oscar and was positioned just short of taxiway Tango. (See figure 1.). The DC-9 was the first in line awaiting taxi for a Huguenot departure. The ground controller said that he requested clearance from the local controller to taxi the DC-9 northwest along runway 31 in order to get him around other aircraft awaiting different departures and into position for takeoff. He said that someone, perhaps the local controller, answered his request affirmatively, however, the local controller did not recall hearing the request nor authorizing the ground controller to use the active runway to taxi the aircraft. At 2147:43, the ground controller cleared the DC-9 to taxi onto taxiway Tango, turn left on runway 31, taxi northwest on the runway, and to hold short of runway 22. The pilot of the DC-9 acknowledged the clearance and began to taxi his aircraft. At 2148:45, the ground controller told the DC-9, "turn hard left now back onto (runway) thirty-one.. .."

The captain said that he taxied on one engine. The taxi route required a right turn of almost 135° from taxiway Oscar to taxiway Tango and a left turn of almost 135° from Tango onto runway 31. Because the left turn onto the runway was more than 90°, he could not see the northwest end of the runway when he began the turn. As he was completing the turn -- the captain estimated he had "about 40" to go" -- he saw two lights coming down the runway at a high rate of speed. Shortly thereafter, he said he saw rotating beacons around the lights. He stopped his airplane and turned on his landing lights. The DC-9 stopped with its nose just over the runway's centerline. The flightcrew was not monitoring the local control frequency nor were they required to do so.

1/ All times herein are eastern daylight time based on the 24-hour clock.

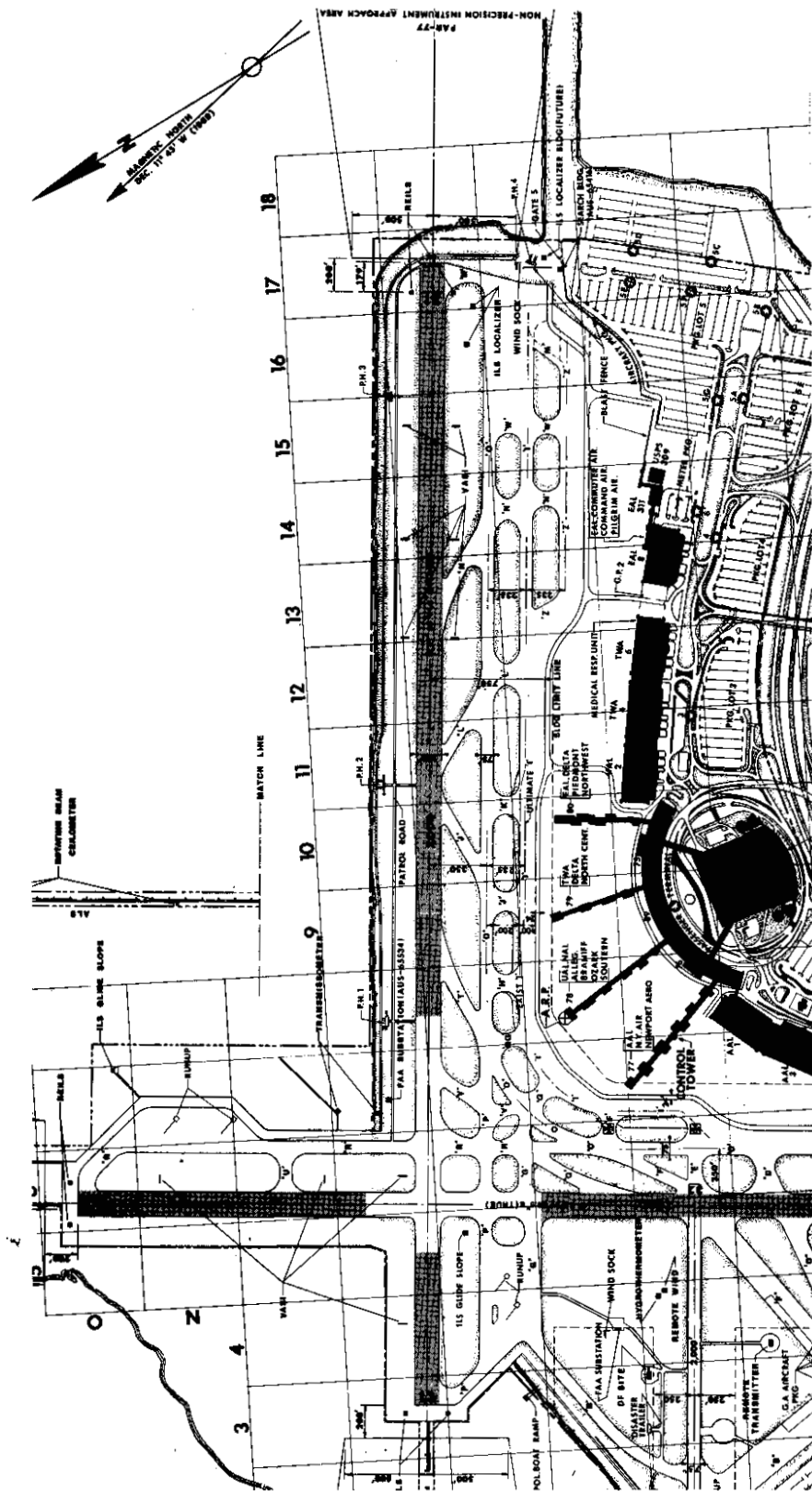


Figure 1 L3 Guardia Airport Runway 13/E1 and Associated Taxiways.

The pilot of the Cessna Citation, N51MW, had filed an IFR flight plan to Ft. Lauderdale, Florida. At 2143:42 the local controller advised them to start engines, and at 2146:15, cleared them to taxi via taxiway Bravo to runway 13 and to hold short of runway 13. The Cessna pilots were not monitoring the ground control frequency, nor were they required to do so.

At 2148:04 the Cessna was cleared to taxi into position on runway 13 and to hold; at 2148:35, the local controller cleared it for takeoff. The copilot replied, "we're rolling." The pilot of the Cessna said that the takeoff clearance was received before his aircraft turned onto the runway, and that he completed the turn onto runway 13 and made a rolling takeoff. He said that at this time he looked down runway 13 "basically for alignment." He also checked runway 22, the landing runway, because that was where he expected there could be a "conflict of traffic, if any." The copilot checked runway 13 as his aircraft turned on to it. He said that "it was clear."

The pilot of the Cessna said that after he had applied takeoff thrust and checked to see that the thrust settings were correct, he looked down the runway and saw lights shining on the lower front fuselage of an aircraft that was entering the takeoff runway. He told the copilot, "There is an aircraft on the runway," and rejected the takeoff. He retarded the thrust levers to idle, applied the wheel brakes, and extended the speed brakes. According to the flightcrew, the indicated airspeed was about 100 kns, just below V_1 and V_R speeds, when the takeoff was rejected. The pilot steered his aircraft to the left and off the paved surface of the runway and shut down his engines to eliminate residual thrust. The evasive tactics were successful. After the Cessna passed the DC-9, the pilot of the Cessna steered his aircraft back on the runway and stopped near taxiway November.

Evasive action was begun about 2,700 ft from the beginning of the takeoff roll. The track made by the Cessna's left main landing gear was visible off the left side of runway 13 for about 600 ft.

1.2 Injuries to Persons

There were no injuries.

1.3 Damage to Aircraft

The DC-9 was not damaged. The Cessna Citation's left main landing gear tire, brake shield, and wheel rim assembly were damaged slightly. In addition, the left engine ingested small amounts of sand and grass.

1.4 Other Damage

One runway edge light was broken.

1.5 Personnel Information

All flightcrew members and controller personnel were properly certificated. (See Appendix B.)

1.6 Aircraft Information

Both aircraft were certificated, equipped, and maintained in accordance with FAA requirements.

1.7 Meteorological Information

At 2000 La Guardia Airport was under the influence of a maritime tropical air mass. An approaching cold front was oriented northeast-southwest through western Pennsylvania. An instability line extended from extreme northwest New Jersey south along the New Jersey-Pennsylvania border into eastern Virginia. Winds were generally southerly, and the weather along the Coastal Plain regions of the Middle Atlantic States was characterized by overcast skies with rain showers, thunderstorms, and occasional fog.

At 2300 the cold front had moved to central Pennsylvania and had retained its northeast-southwest orientation. The instability line extended from northern Delaware along the Delmarva Peninsula, then southwest into North Carolina.

The 2133 radar overlay from the National Weather Service weather radar at New York City showed a large area of thunderstorms to the west and southwest of New York City covering virtually all of northern and central New Jersey, extreme southeastern Pennsylvania, and extending almost to Washington, D. C. Fain showers within this area were up to very heavy (level 4), and cell movement was 260° at 20 kns.

Another area of thunderstorms covered extreme western Massachusetts and extended into New York in the vicinity of Albany. Rain showers in this area were moderate and decreasing in intensity.

The composite map of radar activity issued by the National Severe Storms Forecast Center, Kansas City, Missouri, of radar observations taken at 2135 showed the entire Coastal Plain from the Virginia-North Carolina border to the New York-Connecticut border covered with rain shower and thunderstorm activity; the heaviest activity was over the Delmarva Peninsula. The tops of precipitation returns were about 50,000 feet over the Delmarva Peninsula and about 37,000 feet over central New Jersey.

The following severe weather warnings had been in effect before the incident:

"1430: The National Severe Storms Forecast Center has issued a severe Thunderstorm Watch for most of eastern Pennsylvania from 3:30 p.m. until 7:30 p.m. Large hail and damaging thunderstorm winds are possible for these areas. The Severe Thunderstorm Watch area is along, and 70 statute miles either side of, a line from 40 miles south of Harrisburg, Pennsylvania, to 40 miles north of Scranton, Pennsylvania.

"1630: The National Severe Storms Forecast Center has issued a Severe Thunderstorm Watch for most of Maryland, a small portion of eastern West Virginia, northeastern Virginia, District of Columbia, western Delaware, and the Chesapeake Bay from 5:00 p.m. until 9:00 p.m. Large hail and damaging thunderstorm winds are possible for these areas. The Severe Thunderstorm Watch area is along, and 70 statute miles east and west of, a line from 10 miles south of Richmond, Virginia, to 30 miles north of Baltimore, Maryland."

The surface observations at La Guardia Airport at the time of the incident were as follows:

2135. Special. Ceiling--measured 2,300 ft broken, 4,000 ft overcast, visibility--6 miles, weather--thunderstorm and haze, wind--220° at 8 kns, altimeter--29.94 inches; remarks--thunderstorm began 2133, thunderstorm overhead moving east, occasional lightning in cloud.

2152. Record. Ceiling--measured 2,300 ft broken, 3,500 ft overcast, visibility--6 miles, weather--thunderstorm with moderate rain showers and haze, temperature--70° F., dewpoint--64° F., wind--190" at 8 kns, altimeter--29.94 inches; remarks--thunderstorm began 2133, rain began 2140, thunderstorm overhead moving east, occasional lightning in cloud.

1.8 Aids to Navigation

Not applicable

1.9 Communications

No communication problems were reported.

1.10 Aerodrome Information

La Guardia Airport, elevation 22 ft m.s.l., is served primarily by two runways; runway 4/22; and runway 13/31. Runway 13 is 6,820 ft long and 150 ft wide. The runway is equipped with high intensity runway lights and centerline lights.

1.11 Flight Recorders

Not applicable

1.12 Wreckage and Impact Information

Not applicable

1.13 Medical and Pathological Information

There was no evidence of any physiological or psychological conditions which would have precluded the flightcrew and controller personnel from performing their duties.

1.14 Fire

Not applicable

1.15 Survival Aspects

Not applicable

1.16 Tests and Research

Not applicable

1.17 Additional Information

1.17.1 La Guardia Tower Controller Positions and Duties

The local controller and ground controller are positioned approximately side by side in the tower cab. The crew coordinator is positioned between and behind the ground and local controller positions. (See figure 2.) The local controller is responsible for handling all arriving and departing traffic and has the responsibility for the use of all runways on the airfield. The ground controller is responsible for the handling of ground movements of aircraft.

The crew coordinator is responsible for the coordination between the various positions in the tower, and any matters pertaining to landing or departing aircraft and any aircraft operating through the area. However, the crew coordinator does not have the capability to communicate directly with the aircraft.

At the time of the incident, the crew coordinator was talking on the hotline to the NYARTCC and the New York Common IFR Room trying to get "some releases and new clearances for the first 10 to 12 aircraft that were waiting for departure."

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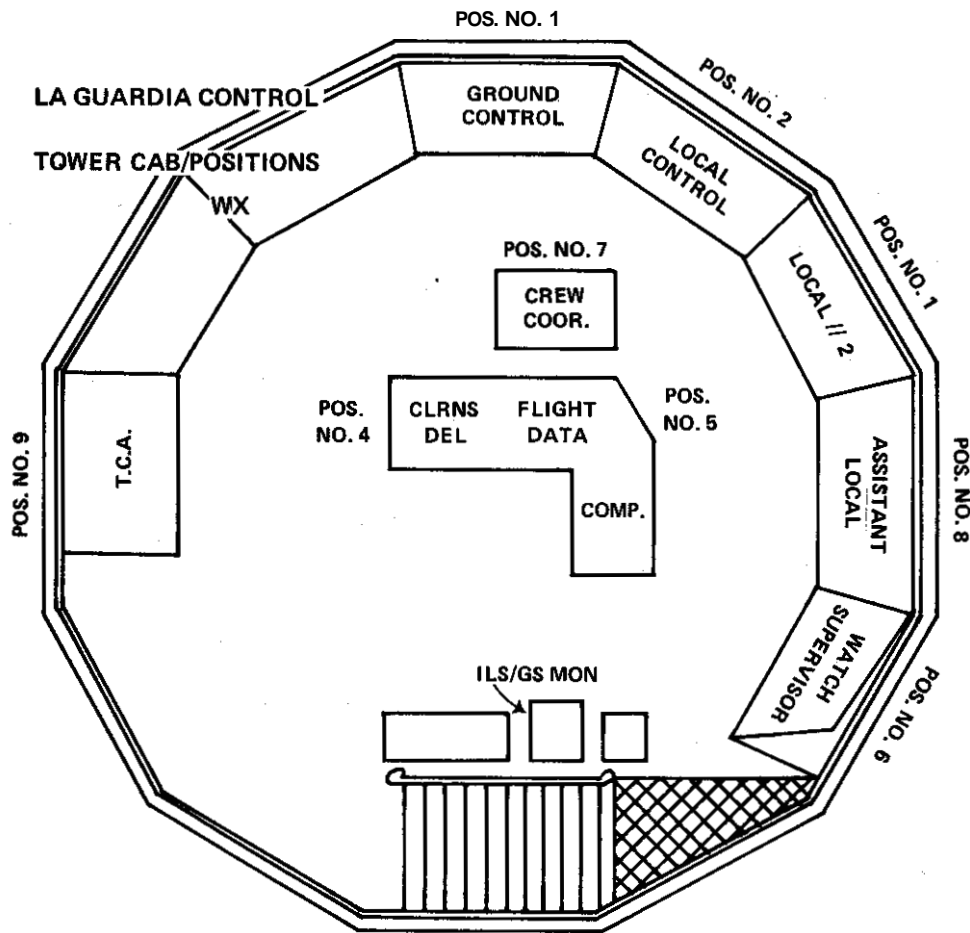


Figure 2. La Guardia control tower Cab positions.

1.17.2 Air Traffic Control Procedures

The recommended procedures for air traffic controllers are contained in the Air Traffic Control (ATC) Handbook 7110.658, dated January 1, 1978. Paragraph 971 of the Handbook states, "Ground control must obtain approval from local control prior to authorizing an aircraft or vehicle to use any portion of an active runway, unless alternate procedures are contained in a facility directive." On June 21, 1978, there was no current facility directive at La Guardia tower establishing an alternative to the provisions of paragraph 971.

The ground controller stated that he believed the local controller had approved his request to clear North Central 57 onto the active runway. The tower transcript disclosed that about 2 min after the incident the ground controller told the DC-9 crew that "I had clearance to go on the runway and the other controller let him go off thirteen." The local controller said that he did not recall the request and that he did not grant approval.

Although the crew coordinator cannot grant approval to use the active runway, he is authorized to relay an approval from the local controller to the ground controller. In this instance the crew coordinator stated that he heard the ground controller ask for approval to taxi the DC-9 along the active runway, and that the local controller answered, "yes, go ahead or some answer to the affirmative."

The crew coordinator said that he was using the telephone hotline to the NYARTCC at the time, however, he did not believe he had used any words that could have been misunderstood by the ground controller.

1.17.3 Severe Weather Avoidance Plan (SWAP)

The NYARTCC's Severe Weather Avoidance Plan (SWAP) is set forth in FAA Order EA AT 7110.28B, the provisions of which became effective on March 28, 1974. The purpose of the plan is to reroute traffic around severe weather. The SWAP is a safety plan; it is not designed to reduce delays. Once the SWAP is implemented, adjacent centers are notified, and flow control procedures are implemented to try to avoid traffic saturation.

The SWAP requires that the Center monitor every route to insure that it is clear of weather. Therefore, before the tower can release a departure, the route must be verified and approved by the NYARTCC. If the Center verifies that the route is clear of weather, it will call the tower and clear the tower to release the aircraft on that route. In addition to rerouting and using alternate routes, spacing between aircraft can be increased, and airspeed control procedures may be used to enhance traffic flexibility and insure that areas of severe weather are circumnavigated.

On June 21, 1978, the NYARTCC placed the SWAP in effect at 1245, and it was still in effect when the incident occurred. The La Guardia Tower Daily Record of Facility Operations disclosed that between 1245 and 2145 there were 40 entries related to the closure of departure routes, extended aircraft spacing on SID's, and the rerouting of departure aircraft. Several times during this period the Common IFR Room stopped all departures. At one point the log indicated that the Huguenot VORTAC was the "only escape route at present," and that there was a 30-nmi in trail separation restriction over Huguenot. There were also several entries which showed that inbound traffic was halted because the airport was already overcrowded.

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The evidence showed that the flow control procedures included in the SWAP had been implemented. The NYARTCC, from time to time, was not accepting flight plans of aircraft destined for La Guardia, and aircraft bound for La Guardia were being held at their airports of departure. The effects of the weather were such that delays of 1 to 2 hrs were being experienced at Kennedy International Airport and Newark Airport; and, Philadelphia International Airport was experiencing 4-hr delays.

The tower team supervisor testified that during his 3-yr tenure at La Guardia, they had been required to stop arrivals only two to three times, and that on June 21 the "weather itself was the most severe I have ever experienced at La Guardia on our routes that evening."

1.18 New Investigative Techniques

None

2. ANALYSIS

The flightcrew and controller personnel involved in this incident were qualified in accordance with FAA regulations.

Weather was a factor since thunderstorms throughout the area had delayed the movement of air traffic. Throughout the afternoon and evening of June 21, the storms had affected almost every SID serving the New York area, and La Guardia Airport in particular. Based on these weather conditions the NYARTCC's decision to place the SWAP in effect was prudent, and the evidence showed that the SWAP accomplished its purpose of keeping the aircraft within the NYARTCC's airspace out of the severe weather. However, the procedures used to avoid the weather created traffic delays which caused the buildup of ground traffic at La Guardia Airport. There was no evidence of any other factors which either caused or contributed to these delays.

When the incident occurred, departure releases at La Guardia were based on the accessibility of SID's instead of aircraft sequence in the departure lineup. The airport's congestion was so severe that the controller's options were extremely limited with regard to ground movements of aircraft. Every change in the release sequence posed a problem, therefore, when aircraft using the Sloat SID were released, the only available taxi route to position the DC-9 on runway 13 for takeoff was the active runway itself. The ground controller's decision to use it was reasonable.

The workloads for the ground controller, local controller, and crew coordinator were extremely heavy at the time. Although the testimony of the crew coordinator appears to corroborate the ground controller's testimony that he did request approval to use of the active runway, the fact that his attention was also directed to his primary task of coordinating clearances via the hotline, and the fact that he could not remember the wording used to grant approval do not permit the

conclusion that the local controller did approve the request. Based on the available evidence the Safety Board can only conclude that the proper coordination was not effected and that the incident resulted from a misunderstanding between the local controller and ground controller.

Although the primary cause of the incident was personnel error, the coordination procedures in effect in the tower were subject to this type of error and helped to produce the misunderstanding between the controllers. The procedures did not require the pilot to establish direct communications with the local controller either before entering the runway, or while on the runway, or leaving the runway. These procedures placed additional persons between the two main parties to the transaction--the local controller who was responsible for the use of the active runway, and the pilot who wished to use it. Allowing the other parties to relay the request for the use of the active runway and the authorization for its use instead of relying on direct communication between the pilot and the local controller made the system vulnerable to error, and, as demonstrated here, the required coordination procedures broke down when they were exposed to the stressful situation existing at La Guardia Airport that night.

The breakdown in coordination placed the entire responsibility for avoiding catastrophe on the flightcrews of the two aircraft. Examination of the local and ground controllers' transcripts showed that the DC-9 entered the active runway simultaneously or just after the Cessna began its takeoff roll. Therefore, the runway was clear of traffic when the Cessna's copilot checked it before and during the turn onto the active runway.

The 135° left turn from taxiway Tango to the active runway made it almost impossible for the DC-9 flightcrew to see the takeoff end of runway 13 before they began the turn and during the initial stages of the turn.

The actions of each pilot when he saw the other's aircraft were both timely and correct. The DC-9 pilot stopped his aircraft promptly and turned on his landing lights. His actions enabled the Cessna pilot to see the DC-9 early on the takeoff roll before his aircraft reached V_1 or V_r speeds and gave the Cessna pilot additional maneuvering space to avoid the DC-9. The Cessna pilot used both the time and space to slow his aircraft, to steer it off the runway, and to avert what could have been a catastrophic accident.

3. CONCLUSIONS

3.1 Findings

1. The weather conditions justified the NYARTCC's decision to place the **SWAP** in effect.
2. The severe weather in the NYARTCC area caused the buildup of ground traffic at La Guardia Airport.
3. Because of the weather, departure releases at La Guardia were based on the accessibility of **SID's** instead of aircraft sequence in the departure lineup. Because of airport congestion, the ground controller's options were limited with regard to ground movement of aircraft.
4. The ground controller's decision to use the active runway as a taxi route to position the DC-9 **was** reasonable and would have been proper had the required coordination been **accomplished effectively**.
5. The coordination procedures in effect for using the active runway as a taxi route broke down when exposed to heavy ground traffic loads.
6. The quick and decisive actions of the pilots, particularly those of the Cessna's pilot, precluded a catastrophic accident.

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3.2 Probable Cause

The National Transportation Safety Board determines **that** the probable cause of this incident was the failure of the ground and local controllers in the La Guardia tower to effect the required coordination, before using the active runway for taxiing an aircraft. Also contributing to the incident was a coordination procedure which did not require the local controller to establish direct communication with the pilot of the aircraft before clearing him to use the active runway for extended taxi operations.

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4. RECOMMENDATIONS

On June 26, 1978, the FAA's Eastern Region issued the following Regional Notice (RENOT):

- "3. Effective immediately, Facility Chiefs shall ensure the following:

- a. With the approval of local control, ground control may authorize an aircraft guarding ground control frequency to cross an active runway. An aircraft wishing to taxi along an active runway shall be held clear of that runway and instructed to contact local control.
- b. Aircraft may be authorized to taxi along an active runway only by local control, by means of direct radio communications with the aircraft on local control frequency.
- c. Develop mandatory briefing items that emphasize a. and b. above."

The provisions of the RENOT apply to ATC facilities in the Eastern Region. Testimony at the public hearings disclosed that these provisions would not be applied nationally until their effects within the Eastern Region were evaluated thoroughly.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/sf FRANCIS H. McADAMS
Member

/s/ PHILIP A. HOGUE
Member

February 22, 1979

5. APPENDIXES

APPENDIX A

Investigation and Hearing

1. Investigation

The Safety Board was notified of the incident about 2235 on June 21, 1978. Investigators from the Safety Board's New York Field Office and Washington, D.C., headquarters went to the scene. Working groups were established for operations, air traffic control, and weather. The Federal Aviation Administration was party to the investigation.

2. Public Hearing

A public hearing was held in Jamaica, New York, on August 29, 30, and 31, 1978. Parties to the hearing were the Professional Air Traffic Controllers Organization, the Air Line Pilots Association, North Central Airlines, Inc., the National Weather Service, Aircraft Owners and Pilots Association, and the Federal Aviation Administration.

APPENDIX B

Personnel Information

Mr. Michael L. Garay

Mr. Garay was working the local control position at the time of the incident. Mr. Garay is a journeyman controller, is facility rated, and has a Control Tower Operators License. At the time of the incident he had been on duty 6 hrs 49 min and had been working the local control position 2 hrs 52 min.

Mr. Steven Fanno

Mr. Fanno was working the ground control position at the time of the incident. Mr. Fanno is a full performance level controller, is facility rated, and has a Control Tower Operators License. At the time of the incident he had been on duty 6 hrs 49 min and had been working the ground control position 2 hrs 42 min.

Mr. Joseph Davis

Mr. Davis was working the crew coordinator position at the time of the incident. Mr. Davis is a journeyman controller, is facility rated, and has a Control Tower Operators License. At the time of the incident he had been on duty 6 hrs 49 min and had been working the crew coordinator position 46 min.

Mr. Ronald Ruble

Mr. Ruble was the pilot of the Cessna Citation. He has Airline Transport Pilot Certificate No. 2120162, with airplane single and multi-engine land ratings. Mr. Ruble had flown about 4,500 hrs, 60 hrs of which were accomplished in the Cessna Citation. He has a Second-class Medical Certificate, dated November 30, 1977, with a waiver for distant vision in the right eye.

Mr. Harold P. Shappee

Mr. Shappee was the copilot of the Cessna Citation. He has a Commercial Pilot Certificate No. 1982083 with airplane single and multiengine land ratings and instrument rating. Mr. Shappee had flown 2,600 hrs, 170 hrs of which were accomplished in the Cessna Citation. His First-class Medical Certificate, dated June 9, 1978, had no limitations.

Captain Edward L. Erickson, Jr.

Captain Erickson was the pilot of the North Central DC-9. He has an Airline Transport Pilot Certificate No. 1141328 with an aircraft multiengine land rating and a type rating in the DC-9. He had flown about 25,000 hours, about 3,000 hours of which were flown in the DC-9. The captain has a First-class Medical Certificate, dated June 9, 1978, with no limitations.

First Officer Donald L. Van Vuren

First Officer Van Vuren was the copilot of the North Central DC-9. He has Airline Transport Pilot Certificate, No. 1572822 with a multiengine land rating and had flown 9,100 hrs. His First-class Medical Certificate, dated March 2, 1978, had no limitations.

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