Aviation Investigation Final Report

Location:	Chicago, Illinois	**Incident Number:**	OPS06IA006
Date & Time:	March 21, 2006, 16:20 Local	**Registration:**	D-APAC
Aircraft:	Airbus Industrie 319	**Aircraft Damage:**	None
Defining Event:		**Injuries:**	29 None
Flight Conducted Under:	Part 129: Foreign		

Analysis

Certified professional controller (CPC) providing on-the-job training working North Local Control position for 24 minutes responsible for 8 aircraft. Plan X in effect (landing and departing runways 4 and 9). Developmental controller (DEV) is certified on all positions except local control (has 150 hours of the allotted 180.) Lufthansa (DLH) flight 437, A319, was instructed to taxi-into-position-and-hold on runway 4L to wait for the previous arrival to exit the runway. Chautauqua (CHQ) flight 7826, E145, was issued taxi-into-position-and-hold runway 9L and was advised traffic (DLH437) would be departing runway 4L. (It is approximately 1,900 feet from the Runway 9L threshold to the intersection of Runway 4L.) When the runway 9L traffic exited, DLH437 was cleared for takeoff. Thirty-five seconds later the DEV cleared CHQ7826 for takeoff on runway 9L. The Local Monitor and the CPC did not hear the DEV clear CHQ7826 for takeoff. Shortly thereafter, the Local Monitor noticed both aircraft were rolling and told the North Local Controller CPC who canceled takeoff instructions to both aircraft. Closest proximity 100 feet when both aircraft stopped at the runway intersection. AMASS did not have crossing runway logic installed and did not alarm. The pilot of DLH437 called the tower later and said they observed the E145 and was aborting takeoff when the controller told him to stop.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The probable cause of this incident is the local controller's failure to ensure proper separation between Lufthansa (DLH) flight 437 andChautauqua (CHQ) flight 7826. Contributing to the probable cause was the local controller's failure to monitor the situation and advise the local controller that DLH437 had not departed prior to the controller issuing the takeoff clearance to CHQ7826.

Findings

Occurrence #1: NEAR COLLISION BETWEEN AIRCRAFT
Phase of Operation: TAKEOFF - ABORTED

Findings
1. (C) CONTROL TOWER - IMPROPER

Factual Information

1. History of Flight

At the time of the incident, ORD was operating in configuration "Plan X". A developmental controller (DEV) was being trained by an on the job training instructor (OJTI) at the North Local Control (NLC) position at the time of the incident. The DEV was responsible for making all transmissions and performing all coordination for the position. The OJTI was also plugged into the NLC position, and was standing beside the DEV. They had been assigned to the position for about 20 minutes and were responsible for flights arriving and departing on runway 4L, 9L, and 32L. A third controller was assigned as a local monitor (LM) for the NLC position. The LM was responsible for monitoring NLC traffic for potential conflicts and alerting the NLC to any potential conflicts.

Air traffic recordings indicate that the DEV had issued 11 radio transmissions to 8 different airplanes in the 96 seconds before the incident. The DEV described traffic conditions at the time as light to moderate, but "building." The OJTI said traffic conditions were moderate or slightly more. LM described the traffic as moderate with normal complexity.

At 1618:48, the DEV instructed DLH437, which was holding short of runway 4L on taxiway B, to taxi into position and hold on runway 4L.

At 1619:06, the DEV instructed CHQ7826, which was holding short of runway 9L on taxiway J, to taxi into position and hold on runway 9L.

At 1619:10, the DEV cleared DLH437 for takeoff on runway 4L. He recalled issuing this clearance about the time a previous arrival passed through the intersection.

At 1619:20, the DEV instructed a regional jet, BTA2460, to taxi into position and hold behind DLH437 on runway 4L.

At 1619:27, the DEV instructed EGF192, which was rolling out on runway 9L, to exit runway 9L at taxiway P, and advised the flight crew of "traffic crossing downfield." He also instructed a previous departure from runway 9L to contact departure control.

The DEV stated in his interview that he recalled considering at this time whether to clear N84HP to cross runway 9L. After checking the distance of the next runway 9L arrival, he decided instead to depart CHQ7826 and a second airplane from runway 9L.

At 1619:45, the DEV cleared CHQ7826 for takeoff, adding, "don't delay the roll," and instructed another regional jet, SKW5811 to taxi into position and hold on runway 9L behind CHQ7826.

The OJTI recalled hearing the DEV issue this clearance, but the LM did not.

The DEV recalled that he began visually scanning runway 9L, from left to right, before he issued the takeoff clearance to CHQ7826. The OJTI recalled seeing the DEV scan the runway, and recalled visually scanning runway 9L at the same time. Both controllers recalled seeing an airplane in position on runway 4L as they scanned the runway. They stated that they assumed DLH437 had already taken off because of the time that had passed, and that the airplane in position on runway 4L was the regional jet the DEV had cleared into position behind DLH437.

The flight crew of DLH437 reported seeing CHQ7826 moving towards them during their takeoff roll, and decided to abort their takeoff.

The DEV reported that he first noticed the conflict as he was issuing the takeoff clearance to SKW5811, when he noticed DLH437 and CHQ7826 rolling toward each other. The DEV stated that he attempted to make a transmission directing CHQ7826 to stop, but the transmission was blocked.

The LM stated that he first noticed a conflict when he saw CHQ7826 begin to roll. The LM recalled that he made a loud exclamation, but he could not remember what he said.

The OJTI recalled that he first became aware of the conflict when he saw CHQ7826 begin to roll, then saw the airplane in position on 4L begin its takeoff roll, and then noticed DLH437's flight progress strip cocked in the strip bay. At 1620:00, the OJTI transmitted, "Lufthansa 437 stop."

At 1620:05, the DEV transmitted, "Chautauqua 7826 stop."

Ground radar data indicated that DLH437 stopped before the runway intersection, and CHQ7826 rolled through the intersection. ORD managers reported that because the Airport Movement Area Safety System did not have crossing runway logic installed, it did not alarm during the incident.

2. Personnel Information

a. Developmental Controller

1) Background and Experience

The DEV had been an FAA controller for about 15 years. He reported that he had not experienced any previous operational errors or any FAA disciplinary action. Prior to working at the ORD ATCT, he had worked at Chicago Air Route Traffic Control Center (ZAU ARTCC), and had transferred to the ORD ATCT in October 2004. At the time of the incident, he was certified on all tower positions except the LC positions. He stated that he was equally familiar with all three of the tower's local control positions.

2) Training Progress

The DEV had completed about 150 out of 180 total hours of his planned OJT. The DEV's most recent technical training discussion form, dated February 28, 2006, stated that he had continued to show steady improvement on all positions." It stated that he was "currently training on local control" and was "making desired progress."

The DEV reported 12 hours of experience working NLC in the Plan X configuration before the incident. He described NLC in the Plan X configuration as one of the hardest local control positions in the tower, explaining that it was complex because of the crossing runway operations and the volume of traffic. He stated that he had believed before the incident that he had been gaining a good grasp of the position.

3) Medical Information

The DEV reported that he had been diagnosed with obstructive sleep apnea seven or eight years before the incident. He stated that a physician had prescribed him a Continuous Positive Airway Pressure (CPAP) device at that time. However, he had experienced side effects from using the device, soon discontinued its use, and did not seek further treatment. Asked whether he had noticed any daytime sleepiness or other problems as a result of the sleep disorder, he said, "No, not really."

The DEV was required by his FAA medical certificate to wear corrective lenses while working in the tower, and he reported that he was wearing them at the time of the incident. He stated that he did not take any medications, prescription, or non-prescription, that could have affected his performance in the 72 hours before the incident, nor did he drink any alcohol. He also reported no significant changes in his health, finances, or personal life in the year before the incident.

4) 72-Hour History

March 21 was the third day of the DEV's work week. It was his third consecutive evening shift after two days off. His shift times are summarized in Table 1.

Table 1.
Developmental controller's work history.

Date	Start Time	Stop Time	Duration	Turn
March 21	1335	Incident at 1620	2:45	
March 20	1330	2130	8:00	16:05
March 19	1445	2245	8:00	14:45

The OJTI stated the following with respect to the DEV's performance on NLC on the day of the incident, "In the beginning he was a little slow. He wasn't putting guys into position and hold as soon as he should have been. I think he canceled one guy's takeoff clearance, either that

hour or the hour before because he didn't think it would work. I told him it would have been close, but worked. So his judgment was a little bit off." However, the OJTI stated that the DEV did not appear tired.

The DEV stated that he needed 6 to 8 hours of sleep per night to feel rested. He recalled sleep start and stop times for two nights prior to the incident, and for the morning of March 19, but could not recall what time he had gone to sleep on the evening of March 18. The controller said he felt "rested" and "fine" on the morning of the incident, and that he felt alert at the time of the incident. His sleep history is summarized in Table 2.

Table 2.
Developmental controller's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	2230	0630	8:00
March 19-20	2400	0630	6:30
March 18-19	Unknown	0615	Unknown

The DEV stated that he typically worked a position for about an hour followed by 45 minutes to an hour break. The DEV had been working the NLC position for 20 minutes at the time of the incident. Tower position logs indicated that, on March 21, he had worked the position times shown in Table 3, prior to the incident.

Table 3.
Developmental controller's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
NLC (LC4)	1600	1620 (Incident)	0:20	
GC (IG6)	1345	1437	0:52	1:23

b. On the Job Training Instructor

1) Background and Experience

The OJTI had been working as an FAA controller for about 24 years. His initial assignment was the Palwaukee ATCT. He transferred to ORD ATCT in 1986, and had remained there ever since. He was fully certified to work in the tower. He had been qualified as an OJT instructor for about 18 years. He had been involved in a previous operational error on January 3, 2006. Minimum separation between the two aircraft involved in that incident was 2.5 miles horizontal, 800 feet vertical.

2) 72-Hour History

The day of the incident was the second day of the OJTI's work week, following a two-day weekend. His shift times are summarized in Table 4.

Table 4.
OJTI's work history.

Date	Start Time	Stop Time	Duration	Turn
March 21	1330	1620 (incident)	2:50	
March 20	1445	2230	7:45	15:30

The OJTI reported engaging in routine activities before and after his March 20 and March 21 shifts, and went out to dinner with neighbors on Saturday night. He stated that he needed about 6 hours of sleep per night to feel rested. His sleep history is summarized in Table 5.

Table 5.
OJTI's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	0115	0730	6:15
March 19-20	0100	0730	6:30
March 18-19	0230	0800	5:30

The OJTI had spent a total of 1 hour 30 minutes working two different positions prior to the incident. He had been conducting OJT at the NLC position for 20 minutes at the time of the incident. Tower position logs indicated that on March 21, he worked the position times shown in Table 6.

Table 6.
OJTI's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
LC (NL4)	1600	1620 (incident)	0:20	
LM	1340	1446	1:06	1:14

c. Local Monitor

1) Background and Experience

The LM had been working as an FAA controller for about 25 years. He had worked at several tower facilities before being assigned to the ORD tower in October 1986. He was fully certified in the tower.

2) 72-Hour History

The day of the incident was the second day of the local monitor's workweek. His shift times are summarized in Table 7.

Table 7.
Certified professional controller's work history.

Date	Start Time	Stop Time	Duration	Turn

March 21 1330 1620 (incident) 2:50
March 20 1330 2130 8:00 16:00

The local monitor stated that he needed 7.5 to 8 hours of sleep per night to feel rested. His sleep history is summarized in Table 8.

Table 8.
Certified professional controller's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	0030	0815	7:45
March 19-20	1130	0815	8:45
March 18-19	1130	0815	8:45

The LM stated that he thought that the LM position was the second position he had worked on the day of the accident. He could not recall the first position he had worked. Tower position logs indicated that he had worked only the LM position. His time on position is shown in Table 9.

Table 9.
Certified professional controller's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
LM	1559	1635	0:35	

3. Memory Aids

The DEV stated that flight progress strips for aircraft departing on runway 4L and 9L were grouped by runway in his strip bay at the time of the incident. He stated that he had angulated the strips for DLH437 and CHQ7826 when he cleared each of those airplanes for takeoff, and that this was a routine procedure he used to remind himself of airplanes that were already cleared to take off. His OJTI also recalled that both strips were angulated in the strip bay at the time of the incident.

The DEV reported that, in addition to scanning runway 9L, he looked at the strip bay before clearing CHQ7826 for takeoff, and he saw DLH437's strip cocked, but expected the airplane to have already taken off. He stated that he would not have removed DLH437's strip from the strip bay until after the airplane was visible on his radar display with an associated data tag. He stated that the sight of two or more strips angulated in the strip bay was not be an unusual sight, and that he sometimes had as many as four or five strips angulated in the strip bay at one time. He stated, "I did not compute that this aircraft that was stopped [on runway 4L] was that strip."

Asked whether he saw DLH437 when he scanned runway 9L, the DEV said, "When I scanned, I saw an aircraft holding short on 4L. I thought that was the next aircraft. He was not rolling, so that did not tell me it was Lufthansa. My expectation was he was down the runway lifted off

somewhere." Asked whether he had scanned the strips and seen DLH437's cocked, he said, "Yeah, DLH was cocked. Makes no difference, I saw it cocked."

Information

Certificate:	**Age:**
Airplane Rating(s):	**Seat Occupied:**
Other Aircraft Rating(s):	**Restraint Used:**
Instrument Rating(s):	**Second Pilot Present:**
Instructor Rating(s):	**Toxicology Performed:**
Medical Certification:	**Last FAA Medical Exam:**
Occupational Pilot:	**Last Flight Review or Equivalent:**
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	Airbus Industrie	**Registration:**	D-APAC
Model/Series:	319	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	DAPAC
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	Installed, not activated	**Engine Model/Series:**	
Registered Owner:		**Rated Power:**	
Operator:	PrivatAir	**Operating Certificate(s) Held:**	Foreign air carrier (129)
Operator Does Business As:	Lufthansa	**Operator Designator Code:**	L7AY

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ORD,668 ft msl	**Distance from Accident Site:**	
Observation Time:	13:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Broken / 3200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	25 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	-1°C / -7°C
Precipitation and Obscuration:			
Departure Point:	Chicago, IL (KORD)	**Type of Flight Plan Filed:**	IFR
Destination:	Dusseldorf (EDDL)	**Type of Clearance:**	IFR
Departure Time:		**Type of Airspace:**	Class B

Airport Information

Airport:	Chicago O'Hare International A KORD	**Runway Surface Type:**	Asphalt
Airport Elevation:	668 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	rL	**IFR Approach:**	None
Runway Length/Width:	7500 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	6 None	**Aircraft Damage:**	None
Passenger Injuries:	23 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	29 None	**Latitude, Longitude:**	41.986667,-87.907775

Administrative Information

Investigator In Charge (IIC):	Hall, Hilton
Additional Participating Persons:	
Original Publish Date:	November 30, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63376

Aviation Investigation Final Report

Location:	Chicago, Illinois	**Incident Number:**	OPS06IA006
Date & Time:	March 21, 2006, 16:20 Local	**Registration:**	N977RP
Aircraft:	Embraer 145EP	**Aircraft Damage:**	None
Defining Event:		**Injuries:**	49 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Scheduled		

Analysis

Certified professional controller (CPC) providing on-the-job training working North Local Control position for 24 minutes responsible for 8 aircraft. Plan X in effect (landing and departing runways 4 and 9). Developmental controller (DEV) is certified on all positions except local control (has 150 hours of the allotted 180.) Lufthansa (DLH) flight 437, A319, was instructed to taxi-into-position-and-hold on runway 4L to wait for the previous arrival to exit the runway. Chautauqua (CHQ) flight 7826, E145, was issued taxi-into-position-and-hold runway 9L and was advised traffic (DLH437) would be departing runway 4L. (It is approximately 1,900 feet from the Runway 9L threshold to the intersection of Runway 4L.) When the runway 9L traffic exited, DLH437 was cleared for takeoff. Thirty-five seconds later the DEV cleared CHQ7826 for takeoff on runway 9L. The Local Monitor and the CPC did not hear the DEV clear CHQ7826 for takeoff. Shortly thereafter, the Local Monitor noticed both aircraft were rolling and told the North Local Controller CPC who canceled takeoff instructions to both aircraft. Closest proximity 100 feet when both aircraft stopped at the runway intersection. AMASS did not have crossing runway logic installed and did not alarm. The pilot of DLH437 called the tower later and said they observed the E145 and was aborting takeoff when the controller told him to stop.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The probable cause of the incident was the local controller's failure to ensure proper separation between Lufthansa flight 437 and Chautauqua (CHQ) flight 7826. Contributing was the failure of the local monitor to monitor the situation and advise the local controller that Lufthansa had not departed when the local controller issued the takeoff clearance to CHQ7826.

Findings

Occurrence #1: NEAR COLLISION BETWEEN AIRCRAFT
Phase of Operation: TAKEOFF - ABORTED

Findings
1. (C) CONTROL TOWER - IMPROPER

Factual Information

1. History of Flight

At the time of the incident, ORD was operating in configuration "Plan X". A developmental controller (DEV) was being trained by an on the job training instructor (OJTI) at the North Local Control (NLC) position at the time of the incident. The DEV was responsible for making all transmissions and performing all coordination for the position. The OJTI was also plugged into the NLC position, and was standing beside the DEV. They had been assigned to the position for about 20 minutes and were responsible for flights arriving and departing on runway 4L, 9L, and 32L. A third controller was assigned as a local monitor (LM) for the NLC position. The LM was responsible for monitoring NLC traffic for potential conflicts and alerting the NLC to any potential conflicts.

Air traffic recordings indicate that the DEV had issued 11 radio transmissions to 8 different airplanes in the 96 seconds before the incident. The DEV described traffic conditions at the time as light to moderate, but "building." The OJTI said traffic conditions were moderate or slightly more. LM described the traffic as moderate with normal complexity.

At 1618:48, the DEV instructed DLH437, which was holding short of runway 4L on taxiway B, to taxi into position and hold on runway 4L.

At 1619:06, the DEV instructed CHQ7826, which was holding short of runway 9L on taxiway J, to taxi into position and hold on runway 9L.

At 1619:10, the DEV cleared DLH437 for takeoff on runway 4L. He recalled issuing this clearance about the time a previous arrival passed through the intersection.

At 1619:20, the DEV instructed a regional jet, BTA2460, to taxi into position and hold behind DLH437 on runway 4L.

At 1619:27, the DEV instructed EGF192, which was rolling out on runway 9L, to exit runway 9L at taxiway P, and advised the flight crew of "traffic crossing downfield." He also instructed a previous departure from runway 9L to contact departure control.

The DEV stated in his interview that he recalled considering at this time whether to clear N84HP to cross runway 9L. After checking the distance of the next runway 9L arrival, he decided instead to depart CHQ7826 and a second airplane from runway 9L.

At 1619:45, the DEV cleared CHQ7826 for takeoff, adding, "don't delay the roll," and instructed another regional jet, SKW5811 to taxi into position and hold on runway 9L behind CHQ7826.

The OJTI recalled hearing the DEV issue this clearance, but the LM did not.

The DEV recalled that he began visually scanning runway 9L, from left to right, before he issued the takeoff clearance to CHQ7826. The OJTI recalled seeing the DEV scan the runway, and recalled visually scanning runway 9L at the same time. Both controllers recalled seeing an airplane in position on runway 4L as they scanned the runway. They stated that they assumed DLH437 had already taken off because of the time that had passed, and that the airplane in position on runway 4L was the regional jet the DEV had cleared into position behind DLH437.

The flight crew of DLH437 reported seeing CHQ7826 moving towards them during their takeoff roll, and decided to abort their takeoff.

The DEV reported that he first noticed the conflict as he was issuing the takeoff clearance to SKW5811, when he noticed DLH437 and CHQ7826 rolling toward each other. The DEV stated that he attempted to make a transmission directing CHQ7826 to stop, but the transmission was blocked.

The LM stated that he first noticed a conflict when he saw CHQ7826 begin to roll. The LM recalled that he made a loud exclamation, but he could not remember what he said.

The OJTI recalled that he first became aware of the conflict when he saw CHQ7826 begin to roll, then saw the airplane in position on 4L begin its takeoff roll, and then noticed DLH437's flight progress strip cocked in the strip bay. At 1620:00, the OJTI transmitted, "Lufthansa 437 stop."

At 1620:05, the DEV transmitted, "Chautauqua 7826 stop."

Ground radar data indicated that DLH437 stopped before the runway intersection, and CHQ7826 rolled through the intersection. ORD managers reported that because the Airport Movement Area Safety System did not have crossing runway logic installed, it did not alarm during the incident.

2. Personnel Information

a. Developmental Controller

1) Background and Experience

The DEV had been an FAA controller for about 15 years. He reported that he had not experienced any previous operational errors or any FAA disciplinary action. Prior to working at the ORD ATCT, he had worked at Chicago Air Route Traffic Control Center (ZAU ARTCC), and had transferred to the ORD ATCT in October 2004. At the time of the incident, he was certified on all tower positions except the LC positions. He stated that he was equally familiar with all three of the tower's local control positions.

2) Training Progress

The DEV had completed about 150 out of 180 total hours of his planned OJT. The DEV's most recent technical training discussion form, dated February 28, 2006, stated that he had continued to show steady improvement on all positions." It stated that he was "currently training on local control" and was "making desired progress."

The DEV reported 12 hours of experience working NLC in the Plan X configuration before the incident. He described NLC in the Plan X configuration as one of the hardest local control positions in the tower, explaining that it was complex because of the crossing runway operations and the volume of traffic. He stated that he had believed before the incident that he had been gaining a good grasp of the position.

3) Medical Information

The DEV reported that he had been diagnosed with obstructive sleep apnea seven or eight years before the incident. He stated that a physician had prescribed him a Continuous Positive Airway Pressure (CPAP) device at that time. However, he had experienced side effects from using the device, soon discontinued its use, and did not seek further treatment. Asked whether he had noticed any daytime sleepiness or other problems as a result of the sleep disorder, he said, "No, not really."

The DEV was required by his FAA medical certificate to wear corrective lenses while working in the tower, and he reported that he was wearing them at the time of the incident. He stated that he did not take any medications, prescription, or non-prescription, that could have affected his performance in the 72 hours before the incident, nor did he drink any alcohol. He also reported no significant changes in his health, finances, or personal life in the year before the incident.

4) 72-Hour History

March 21 was the third day of the DEV's work week. It was his third consecutive evening shift after two days off. His shift times are summarized in Table 1.

Table 1.
Developmental controller's work history.

Date	Start Time	Stop Time	Duration	Turn
March 21	1335	Incident at 1620	2:45	
March 20	1330	2130	8:00	16:05
March 19	1445	2245	8:00	14:45

The OJTI stated the following with respect to the DEV's performance on NLC on the day of the incident, "In the beginning he was a little slow. He wasn't putting guys into position and hold as soon as he should have been. I think he canceled one guy's takeoff clearance, either that

hour or the hour before because he didn't think it would work. I told him it would have been close, but worked. So his judgment was a little bit off." However, the OJTI stated that the DEV did not appear tired.

The DEV stated that he needed 6 to 8 hours of sleep per night to feel rested. He recalled sleep start and stop times for two nights prior to the incident, and for the morning of March 19, but could not recall what time he had gone to sleep on the evening of March 18. The controller said he felt "rested" and "fine" on the morning of the incident, and that he felt alert at the time of the incident. His sleep history is summarized in Table 2.

Table 2.
Developmental controller's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	2230	0630	8:00
March 19-20	2400	0630	6:30
March 18-19	Unknown	0615	Unknown

The DEV stated that he typically worked a position for about an hour followed by 45 minutes to an hour break. The DEV had been working the NLC position for 20 minutes at the time of the incident. Tower position logs indicated that, on March 21, he had worked the position times shown in Table 3, prior to the incident.

Table 3.
Developmental controller's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
NLC (LC4)	1600	1620 (Incident)	0:20	
GC (IG6)	1345	1437	0:52	1:23

b. On the Job Training Instructor

1) Background and Experience

The OJTI had been working as an FAA controller for about 24 years. His initial assignment was the Palwaukee ATCT. He transferred to ORD ATCT in 1986, and had remained there ever since. He was fully certified to work in the tower. He had been qualified as an OJT instructor for about 18 years. He had been involved in a previous operational error on January 3, 2006. Minimum separation between the two aircraft involved in that incident was 2.5 miles horizontal, 800 feet vertical.

2) 72-Hour History

The day of the incident was the second day of the OJTI's work week, following a two-day weekend. His shift times are summarized in Table 4.

Table 4.
OJTI's work history.

Date	Start Time	Stop Time	Duration	Turn
March 21	1330	1620 (incident)	2:50	
March 20	1445	2230	7:45	15:30

The OJTI reported engaging in routine activities before and after his March 20 and March 21 shifts, and went out to dinner with neighbors on Saturday night. He stated that he needed about 6 hours of sleep per night to feel rested. His sleep history is summarized in Table 5.

Table 5.
OJTI's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	0115	0730	6:15
March 19-20	0100	0730	6:30
March 18-19	0230	0800	5:30

The OJTI had spent a total of 1 hour 30 minutes working two different positions prior to the incident. He had been conducting OJT at the NLC position for 20 minutes at the time of the incident. Tower position logs indicated that on March 21, he worked the position times shown in Table 6.

Table 6.
OJTI's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
LC (NL4)	1600	1620 (incident)	0:20	
LM	1340	1446	1:06	1:14

c. Local Monitor

1) Background and Experience

The LM had been working as an FAA controller for about 25 years. He had worked at several tower facilities before being assigned to the ORD tower in October 1986. He was fully certified in the tower.

2) 72-Hour History

The day of the incident was the second day of the local monitor's workweek. His shift times are summarized in Table 7.

Table 7.
Certified professional controller's work history.

Date	Start Time	Stop Time	Duration	Turn

March 21 1330 1620 (incident) 2:50
March 20 1330 2130 8:00 16:00

The local monitor stated that he needed 7.5 to 8 hours of sleep per night to feel rested. His sleep history is summarized in Table 8.

Table 8.
Certified professional controller's self-reported sleep history, March 18 - March 21, 2006.

Date	Start Time	Stop Time	Duration
March 20-21	0030	0815	7:45
March 19-20	1130	0815	8:45
March 18-19	1130	0815	8:45

The LM stated that he thought that the LM position was the second position he had worked on the day of the accident. He could not recall the first position he had worked. Tower position logs indicated that he had worked only the LM position. His time on position is shown in Table 9.

Table 9.
Certified professional controller's time on position for March 21, 2006.

Position	Start Time	Stop Time	Duration	Break
LM	1559	1635	0:35	

3. Memory Aids

The DEV stated that flight progress strips for aircraft departing on runway 4L and 9L were grouped by runway in his strip bay at the time of the incident. He stated that he had angulated the strips for DLH437 and CHQ7826 when he cleared each of those airplanes for takeoff, and that this was a routine procedure he used to remind himself of airplanes that were already cleared to take off. His OJTI also recalled that both strips were angulated in the strip bay at the time of the incident.

The DEV reported that, in addition to scanning runway 9L, he looked at the strip bay before clearing CHQ7826 for takeoff, and he saw DLH437's strip cocked, but expected the airplane to have already taken off. He stated that he would not have removed DLH437's strip from the strip bay until after the airplane was visible on his radar display with an associated data tag. He stated that the sight of two or more strips angulated in the strip bay was not be an unusual sight, and that he sometimes had as many as four or five strips angulated in the strip bay at one time. He stated, "I did not compute that this aircraft that was stopped [on runway 4L] was that strip."

Asked whether he saw DLH437 when he scanned runway 9L, the DEV said, "When I scanned, I saw an aircraft holding short on 4L. I thought that was the next aircraft. He was not rolling, so that did not tell me it was Lufthansa. My expectation was he was down the runway lifted off

somewhere." Asked whether he had scanned the strips and seen DLH437's cocked, he said, "Yeah, DLH was cocked. Makes no difference, I saw it cocked."

Pilot Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Embraer	**Registration:**	N977RP
Model/Series:	145EP	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	N977RP
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	Installed, not activated	**Engine Model/Series:**	
Registered Owner:		**Rated Power:**	
Operator:	CHAUTAUQUA AIRLINES INC	**Operating Certificate(s) Held:**	Commuter air carrier (135)
Operator Does Business As:		**Operator Designator Code:**	CHQA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ORD,668 ft msl	**Distance from Accident Site:**	
Observation Time:	13:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Broken / 3200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	25 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	-1°C / -7°C
Precipitation and Obscuration:			
Departure Point:	Chicago, IL (KORD)	**Type of Flight Plan Filed:**	IFR
Destination:	Louisville, KY (KSDF)	**Type of Clearance:**	IFR
Departure Time:		**Type of Airspace:**	Class B

Airport Information

Airport:	Chicago O'Hare International A KORD	**Runway Surface Type:**	Asphalt
Airport Elevation:	668 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	rL	**IFR Approach:**	None
Runway Length/Width:	7500 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	3 None	**Aircraft Damage:**	None
Passenger Injuries:	46 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	49 None	**Latitude, Longitude:**	41.986667,-87.907775

Administrative Information

Investigator In Charge (IIC):	Hall, Hilton
Additional Participating Persons:	
Original Publish Date:	November 30, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63376