

National Transportation Safety Board

Office of Aviation Safety

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AIR TRAFFIC CONTROL

Group Chair's Factual Report

November 1, 2022

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A. INCIDENT

Location: Tulsa, Oklahoma
Date: June 8, 2022
Time: 0413 central daylight time (CDT)¹
0913 coordinated universal time (UTC)
Airplane: Boeing 757-200, N949FD, FedEx flight 1170 (FDX1170)

B. AIR TRAFFIC CONTROL GROUP

Group Chair	Brian Soper Operational Factors (AS-30) National Transportation Safety Board Washington, DC
Subject Matter Expert ²	Sabrina Woods Human Performance/Survival Factors (AS-60) National Transportation Safety Board Washington, DC
Group Member	James Sudduth ATC Subject Matter Expert Federal Aviation Administration Dallas-Fort Worth, TX
Group Member	Brandon Johnson Air Safety Investigator National Air Traffic Controllers Association Salt Lake City, UT

C. SUMMARY

On June 8, 2022, at 0413 central daylight time, a Boeing 757-200, N949FD, operating as FedEx flight 1170, landed on the wrong runway at Tulsa International Airport (TUL), Tulsa, Oklahoma. The pilot and copilot were not injured, and the aircraft was not damaged. The flight was cleared for a visual approach and landing on runway 18L, however the airplane landed on runway 18R. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 121 cargo flight from Fort Worth Alliance Airport (AFW), Fort Worth, Texas to TUL.

¹ All times are CDT unless otherwise noted.

² A subject matter expert (SME) from AS-60 / HP was embedded with, but not an actual member of the ATC group. An HP section has been included within this report with more detailed HP information contained in the OPS/HP Factual Report located in the public docket.

D. DETAILS OF THE INVESTIGATION

On June 8, 2022, an air traffic control (ATC) work group was formed. The group consisted of the NTSB group chair, a subject matter expert from the FAA, and an air safety investigator (ASI) from NATCA. Also embedded with the ATC group, was an NTSB human performance investigator from AS-60. On-site investigative work was scheduled for the week of June 20, 2022.

On June 21, 2022, the group arrived in Tulsa and conducted an organizational meeting at the hotel and reviewed the agenda for the week.

On June 22, 2022, the group met at the Tulsa Airport Traffic Control Tower (TUL ATCT) and was provided an in-brief by the TUL ATCT Air Traffic Manager (ATM). Also in attendance at the in-brief were representatives from the FAA's Safety Intelligence and Response Group (SIRG), Central Service Area Quality Control Group (CSA QCG), and office of Runway Safety. The group was provided an operational tour of the control tower cab, after which the group reviewed data³ and controller background information followed by an interview with the ATM. The group returned to the hotel to work on field notes and returned to the facility in the late evening to observe night operations from the tower cab in lighting conditions consistent with those at the time of the incident.

On June 23, 2022, the group met at TUL ATCT, reviewed additional data that had been requested, then conducted an interview with the local control (LC) controller that was providing services at the time of the incident, as well as an unrelated certified professional controller (CPC) that was also fully certified and had experience working the mid-shift configuration as well. The group then concluded the on-scene phase of the ATC field investigation, returned to the hotel, and completed the group field notes.

E. FACTUAL INFORMATION

1.0 History of Flight

TUL ATCT was the ATC facility providing services to FDX1170 at the time of the incident. The following timeline was developed using certified audio re-recordings and Automatic Dependent Surveillance - Broadcast (ADS-B) data provided by the FAA. Times are rounded to the nearest minute for brevity and altitudes are in feet above mean sea level (msl). This is a summary of communications between FDX1170 and air traffic control⁴.

³ Facility and controller administrative data provided by the FAA is included in attachment 1.

⁴ A transcript of cockpit voice recorder (CVR) communications that includes all pertinent ATC communications with FDX1170 is included in the CVR Group Chair's Factual Report.

- 0358 The pilot of FDX1170 first contacted TUL ATCT approach control descending through 16,200 feet. and stated they were in receipt of ATIS⁵ information Delta. The controller acknowledged and advised the pilot to expect the visual approach to runway 18L and instructed them to descend and maintain 6,000 feet. The pilot acknowledged with a correct readback.
- 0403 The controller instructed the pilot of FDX1170 to fly heading 360 and descend to 3,500 feet. The pilot acknowledged with a correct readback.
- 0406 The controller instructed the pilot of FDX1170 to descend and maintain 2,500 feet. The pilot acknowledged with a correct readback.
- 0407 The pilot of FDX1170 reported the field in sight. The controller acknowledged, cleared FDX1170 for the visual approach to runway 18L, followed by a clearance to land runway 18L. The pilot acknowledged with a correct readback.
- 0414 After landing rollout the pilot advised the controller they had landed on the wrong runway [runway 18R] and requested to taxi to parking. The controller then provided taxi instructions to parking.

2.0 Flight Track Surveillance Data⁶

2.1 Airport Surveillance Radar

Certified radar data was provided by the FAA. The data were from the STARS⁷ at TUL ATCT, and the source was the Tulsa ASR-9⁸ radar sensor, located on the airport at TUL. These data were corroborated with the ADS-B data, as all altitudes in ATC are rounded to the nearest 100-foot increment, therefore altitudes referenced in this report were derived from these data and are representative of what ATC would have seen on their radar displays.

⁵ ATIS - Automatic Terminal Information Service - A continuous broadcast of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or specified portion of the day. Each new broadcast is identified with an alphabetical prefix and continuing throughout a 24-hour period beginning with A (Alpha), and updated hourly, or anytime there is a reportable change in the current weather observation.

⁶ Certified radar and ADS-B data are included in attachments 2 and 3 respectively.

⁷ STARS - Standard Terminal Automation Replacement System - A system that receives radar data and flight plan information and presents the information to air traffic controllers on high resolution color displays allowing the controller to monitor, control, accept hand-off of air traffic, and assist with weather avoidance.

⁸ ASR-9 is an airport surveillance radar system admitted into the National Airspace System (NAS), to be utilized by the FAA to monitor civilian and commercial air traffic within the United States.

2.2 Automatic Dependent Surveillance - Broadcast

Certified ADS-B data was provided by the FAA. The data were provided in comma-separated value (csv) format. The ADS-B data provided flight track surveillance information for the entire incident flight. Because the data contained in ADS-B data is much more finite than that contained in radar data, these data were used to produce the graphics in figures 1-3 below.

In all three figures, the incident airplane's flight track is indicated in yellow, and arrows are used to indicate direction of flight. In figure 2, the runways are highlighted in orange for visual reference and in figure 3 runway 18R is indicated in orange and runway 18 left is indicated in green. The dashed lines illustrate the approximate straight-in final approach course for each runway.



Figure 1. Overview of the entire incident flight track overlaid on satellite imagery.

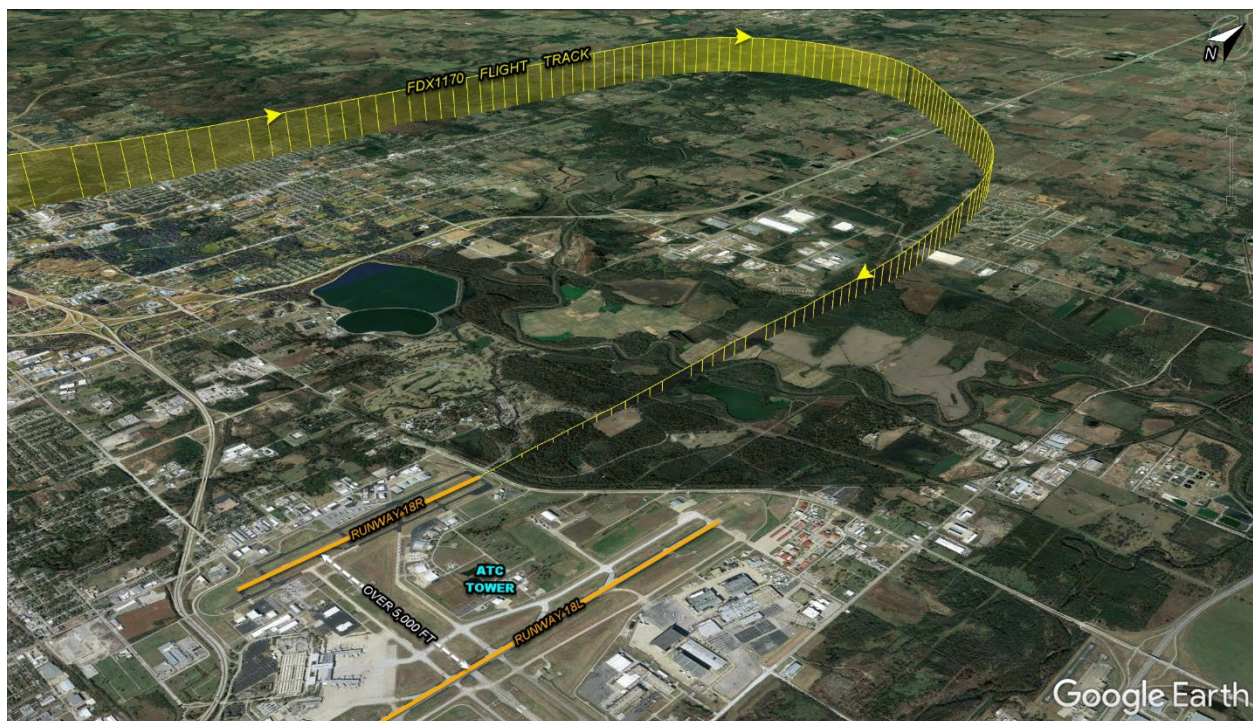


Figure 2. Final portion of the incident flight track in profile view, viewed from SE to NW and overlaid on satellite imagery.

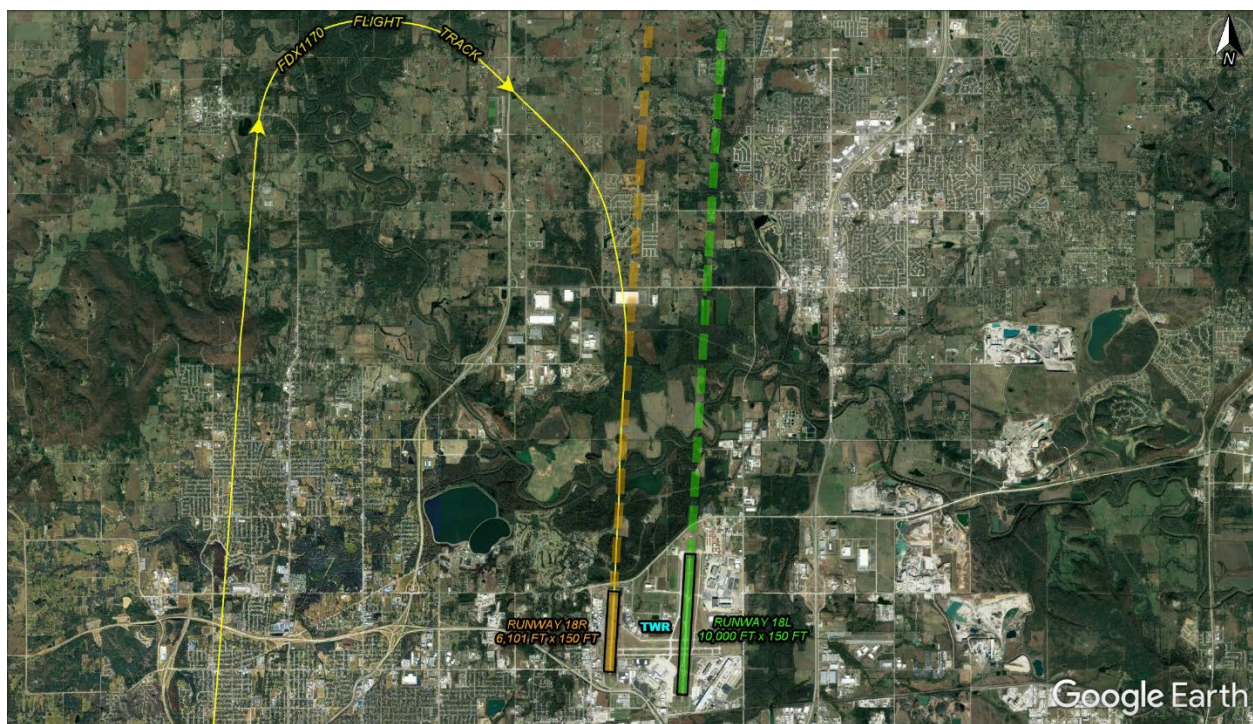


Figure 3. Final portion of the incident flight track in overhead view and overlaid on satellite imagery.

3.0 Meteorological Information

TUL lists an elevation of 677 feet and had an Automated Surface Observation System (ASOS)⁹, which was augmented by certified observers. The magnetic variation was 2.3° east over the area. The following conditions were being reported at the time of the incident.

3.1 Surface Observations

At 0353, TUL¹⁰ reported a wind from 040° at 6 knots, visibility of 10 statute miles, few clouds at 4,300 feet agl, ceiling broken at 5,500 feet agl, broken cloud layer at 7,000 feet agl, broken cloud layer at 25,000 feet agl, temperature 23° Celsius (C), dew point temperature 22° C, altimeter setting of 29.86 inches of mercury. Remarks: automated station with a precipitation discriminator, sea level pressure of 1010.4 hectopascals (hPa), hourly temperature of 23.3° C, and hourly dewpoint of 21.7° C.

TUL was reporting VFR¹¹ conditions, and the longline¹² observations that were disseminated on weather circuits and general flight categories were as follows (observation closest to incident time is in bold for emphasis):

VFR METAR KTUL 080753Z 17004KT 10SM SCT050 BKN250 23/21 A2986
RMK AO2 SLP102 T02330211=

**VFR METAR KTUL 080853Z 04006KT 10SM FEW043 BKN055 BKN070
BKN250 23/22 A2986 RMK AO2 SLP104 T02330217=**

⁹ ASOS - Automated Surface Observing System - Automated sensor suites equipped with meteorological instruments to observe and report wind, visibility, ceiling, temperature, dewpoint, altimeter, and barometric pressure. These systems generally report at hourly intervals, but also report special observations if weather conditions change rapidly and cross aviation operation thresholds.

¹⁰ The NWS uses the 4-digit International Civil Aviation Organization (ICAO) format for station identifiers (as seen in the body of some formatted weather observations). This report uses the 3-digit International Air Transport Association format for station identification, which does not use the geographic designating digit ("K" for stations in the continental U.S. and "P" for U.S. stations in Alaska and the Pacific region) as found in the ICAO format.

¹¹ VFR - Visual Flight Rules - Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

¹² "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

4.0 Environmental Factors - Tower Window Condensation

There were reports from TUL ATCT personnel that the tower cab windows would accumulate condensation at times based on various weather conditions. With the hot, humid outside temperatures and cold, chilled air inside, condensation would form on the outside restricting visibility from the tower. Controllers were not allowed onto the catwalk that surrounds the tower due to structural integrity issues and were required to call building maintenance to respond and clear the windows. Reportedly, the maintenance personnel would often fail to show up, but even when they did, their remedy of using a squeegee to remove the condensation provided only a temporary solution. Attachment 4 contains photographs taken previously by TUL ATCT personnel that show visible condensation during daylight hours, and its effect on visibility.

There is a long history of issues with the window condensation. The ATM produced documentation as far back as 2009, and every controller we spoke with indicated it had been a long-standing problem. Though a legitimate safety concern in general - information gleaned from the interview with the controller providing services to FDX1170 confirmed that condensation WAS NOT a factor in this event.

5.0 Air Traffic Control Personnel

There were two controllers on duty at the time of the incident with one in the tower and one on break. All radar and tower positions were combined to the ground control (GC) / Clearance Delivery (CD) position in the tower. This staffing was the normal mid-shift "TRACAB" configuration¹³, with the controller in-charge (CIC) position also combined and providing oversight at the time of the incident. Three ATC staff were interviewed, and basic information is provided below with detailed background information for the LC controller included in attachment 5. All interviews were recorded, and transcripts were produced and reviewed for accuracy and concurrence by the ATC group¹⁴.

5.1 Air Traffic Manager

The ATM had been in the position since 2015. He started his ATC career in the United States Air Force where he served as an air traffic controller from 1993-2001. He then worked for the Department of Defense (DoD) at Grand Forks (GFK) approach control until being hired by the FAA in 2003. He worked at Amarillo (AMA) ATCT, Salt Lake City Terminal Radar Approach Control (S56 TRACON), Chicago (C90)

¹³ TRACAB - Terminal Radar Approach Control Cab - The term used to identify the configuration when the radar approach control operating position(s) of an ATC facility are located within tower cab. This was a normal configuration for TUL ATCT during the event day/time.

¹⁴ Transcripts of all recorded interviews are included in attachment 6.

TRACON and Corpus Christi (CPR) ATCT before accepting the ATM position at TUL ATCT in 2015.

5.2 Local Control Controller

The LC controller providing services to FDX1170 on the day of the incident. She began her ATC career when she was hired by the FAA in July 2009. After graduating the FAA academy, she worked at Greer (GSP) ATCT until October 2015 when she accepted a position at TUL ATCT. She was 34 years old, possessed a current second-class medical clearance with a requirement to wear corrective lenses while performing ATC duties, and stated that she was wearing them at the time of the incident as required. She was current and proficient on all positions she was working at the time of the incident.

5.3 Certified Professional Controller

The CPC interviewed was not working at the time of the incident and was interviewed as an exemplar CPC familiar with TUL ATCT mid-shift operations. He began his ATC career when he was hired by the FAA in 2014. After graduating the FAA academy, he accepted a position at TUL ATCT. He was 36 years old and fully facility rated.

6.0 Human Factors - ATC

At the time of the incident the LC controller was working with all radar and tower control positions combined to the GC/CD position as described above, and the other CPC on duty had left the tower cab and was on a break. Meteorological conditions at TUL can be such that condensation can form on the tower windows, thus limiting and/or obstructing controller's view from the tower. The LC controller noted that directly preceding the incident, the windows had condensation beginning to appear limiting her view, however, was not a factor in this event and would not have been significant enough to restrict her visibility of FDX1170 on the morning of the incident.

During her interview, the LC controller said she categorized the traffic complexity and volume as being 1 on a scale of 1-5. In a recount of the events, she stated FDX1170 had come in from south, she had confirmed they had the current ATIS, and were assigned runway 18L. She then assigned FDX1170 a northbound heading and at 6,000 feet, amended their altitude and pointed out the field 10 miles south of their position. The crew reported the field in sight, and she cleared them to land. She then diverted her attention from FDX1170 to provide taxi instructions to an unrelated aircraft being repositioned for maintenance. The LC controller said she conducted a visual sweep of the runway when she initially cleared FDX1170 for the approach and to land but admitted she did not look back at the aircraft again. The last time she observed the aircraft on the radar was when it was on a "dogleg" turn to

base. FDX1170 landed and the pilot advised they had landed on the wrong runway. Once the pilot reported their position, the LC controller provided revised taxi instructions from runway 18R.

When asked what the expectation was for a controller monitoring an aircraft upon landing, the LC controller said it was the controller's responsibility to monitor all flights until they safely landed before providing additional taxi information to their final parking location. She admitted she had failed to look back at FDX1170 after clearing them to land. She said in any operating situation, she was able to recognize when she was task saturated or overwhelmed and would readily call for help if she felt that was the case. She stated she was a member of the facility's Local Safety Council (LSC)¹⁵ and would use this event as a lesson learned in reminding other controllers to remain vigilant when monitoring traffic. The ATM said it was his expectation the controller would pay attention and continually scan to the maximum extent possible. He stated his operation did not do their job that morning.

When asked about the safety culture at TUL ATCT both the ATM and the LC controller indicated the culture was good and they took great care to operate a safe environment but neither provided examples. Both said if there was an issue with a controller becoming overwhelmed while at work, or if something occurred outside of work requiring a controller to call out, it was readily handled without fear of reprisal or retribution on behalf of that controller. The ATM stated there was nothing formal written down, however he and the NATCA Facility Representative (FACREP) would work together on any issue brought to them and would seek outside assistance if they were unable to reach agreement. When asked if he could provide examples as to their safety culture, the ATM stated he had an open-door policy, and grievances by any controller could be brought to him at any time. When asked about issues more personal in nature, the ATM said if the controller had an issue speaking to him, there were others in the building they could go to while remaining anonymous. He also said the FAA Hotline¹⁶ and the ATSAP¹⁷ program were other means to report an issue. He said the facility was a smaller one and everyone communicated well with each other, enjoyed their jobs, and they didn't have the problem of controllers having to work with controllers they did not already know. He said if there was an issue

¹⁵ The LSC is a collaborative team of management and bargaining unit employees at ATC facilities that encourages employees to proactively engage in identifying and mitigating local safety concerns. The LSC is part of the Partnership for Safety (PFS) program whose mission is to facilitate the identification and mitigation of hazards at the local level through the use of collaborative LSCs.

¹⁶ The FAA Hotline accepts reports related to the safety of the National Airspace System, violation of a Federal Aviation Regulation (Title 14 *CFR*), aviation safety issues, and reports related to FAA employees or FAA facilities. The FAA Hotline provides a single venue for FAA employees, the aviation community and the public to file their reports.

¹⁷ ATSAP - The FAA's voluntary safety reporting program for ATC personnel based on the Aviation Safety Action Program (ASAP) model. A defined partnership model where safety issues are resolved through corrective action rather than through punishment or discipline. The program includes collection, analysis, and retention of safety data reviewed and acted upon by the FAA and NATCA.

between controllers, it would be resolved immediately. The LC controller said controllers communicated well, and the facility had an active LSC, and she was a member of it. She was also their professional standards representative who had actively worked to resolve interpersonal issues. She considered her coworkers friends and said that got along and would often get together outside the workplace as well.

F. LIST OF ATTACHMENTS

Attachment 1: Facility and Controller Administrative Documentation

Attachment 2: Radar Data

Attachment 3: ADS-B Data

Attachment 4: Photo Array

Attachment 5: Controller Background Information

Attachment 6: Interview Transcripts

Submitted by:

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