



# National Transportation Safety Board Aviation Accident Factual Report

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<b>Location:</b>	BARTLESVILLE, OK	<b>Accident Number:</b>	FTW96FA234A
<b>Date &amp; Time:</b>	06/01/1996, 1412 CDT	<b>Registration:</b>	N7780
<b>Aircraft:</b>	Fairchild KR-31	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## HISTORY OF FLIGHT:

On June 1, 1996, at 1412 central daylight time, a Fairchild KR-31, N7780, and a Waco QCF, N12428, were destroyed during a midair collision near Bartlesville, Oklahoma. Private owners were operating the airplanes as Part 91 flights under Title 14 Code of Federal Regulations (CFR) during the 10th Annual Exposition Fly-In of the National Biplane Association. Both airplanes were on approach to a sod landing area between runway 35 and the taxiway at Bartlesville Municipal Airport (BVO). Neither airplane was in radio contact with the temporary operating control tower. Visual meteorological conditions with 15 miles visibility prevailed for the local personal flights and flight plans were not filed. The 2 occupants of the KR-31 (airline transport rated pilot and a pilot rated passenger) sustained fatal injuries. The 2 occupants of the Waco (private pilot and a pilot rated passenger) received fatal injuries. The flights originated from the airport during the Biplane Fly-By that began at 1330.

During an interview with the Chairman of the Board of the National Biplane Association, it was reported that the First National Biplane Association (NBA) Fly-In took place in June 1987, as a "social" fly-in. Through the years, the fly-in grew in the number of biplanes and exposition participants, and the NBA "redirected its efforts to make a contribution towards keeping the biplane movement alive by fulfilling the purpose to educate the public on the history and development of biplane aircraft and to preserve the biplane."

The Pilot/Operator report revealed that on June 1, 1996, the Fairchild departed the airport at 1345 for a "short ride." A video tape submitted by a witness revealed the following information; however, the time and sequencing of all events could not be determined from the video. On June 1, 1996, a P51 Mustang arrived at the airport and parked on the ramp area, and on both days a New Standard D25 biplane gave rides from the grass area and was continually loading and unloading passengers. During the fly-by, various airplanes participated. The video revealed that the Mustang departed the ramp area for departure on runway 35, the Fairchild and other airplanes taxied from the grass onto the taxiway, the Standard continued the rides, and subsequently, the Waco taxied for departure. Observed on the video was the P51 fly-by, the Waco departure from the sod area, the D25 departure from the sod area, another

P51 fly-by, the Waco fly-by, and the P51 taxiing to the ramp as portions of each midair airplane descended toward the ground.

The following information was revealed during interviews, conducted by the investigator-in-charge, with witnesses and controllers and on the enclosed written statements. Highway 60 runs east and west perpendicular to the approach end of runway 35 and the airplane traffic was landing to the north on runway 35 or the sod area paralleling the runway (see enclosed airport diagram). Two witnesses traveling east on Highway 60 observed the airplanes flying side by side toward the south [downwind]. Subsequently they saw one airplane veer west and one east at which time one of the witnesses observed the left wings of both airplanes hit. The other witness stated that one airplane tried to dive under the other airplane prior to wing contact.

A witness traveling west on Highway 60 stated that "one airplane was flying south on the downwind leg of the traffic pattern at approximately two to three hundred feet [and] the other aircraft [was] at approximately the same altitude coming slightly from behind and from the west." This witness further stated that the "lead aircraft did a steep banking maneuver to the left or the east [and] it was then struck by the aircraft coming slightly from the west." The witness did not positively identify which airplane was the "lead aircraft".

Another witness, using 10X binoculars, observed the Fairchild traveling south on downwind "setting up for base leg [and the] Waco ma[k]e a steep diving approach fl[y] low down the runway to [a] point [and] then proceed to climb and bank steeply to the south."

The pilot of the D25 airplane that was giving rides reported observing the Fairchild heading north "about 2 miles west" of the D25 at 1,000 feet AGL. The D25 pilot further stated that "I thought that [the Faichild] was going to get in trail behind me." He further reported observing the Waco making a left climbing turn at the approach end of runway 35 and subsequently observed the Waco level at about 500 feet AGL, heading about 250 degrees, and fly under the D25 heading about 300 degrees.

Two witnesses observed the airplanes flying east and parallel to Highway 60. One of these witnesses reported that the Waco was underneath the Fairchild and "all of a sudden, I saw the Waco pull up as if he was going to do a roll [and] he collided with the Fairchild"

One witness saw the Fairchild on downwind and noticed an airplane gaining on the Fairchild from behind its flight path. The witness stated that he observed the Fairchild's "right wings lift (roll to the left), the[n] wreckage separate, and fall to the ground."

A line worker, at the fixed base operation, reported observing the Fairchild "turning base from the south and [the] Waco turning base from the north." He further stated that the Waco, which appeared lower than the Fairchild, "pulled up and the 2 planes collided."

One witness reported that "just as the 2 planes collided the yellow planes [Waco] wings folded up and it started down at a steep angle, the dark colored plane [Fairchild] veered off to the

southwest carrying some of the yellow planes wing which dropped off and the dark plane continued to the southwest for a few seconds then nosed sharply and crashed a few seconds after the yellow plane crashed. The yellow plane crashed and burst into flames."

One controller stated that he "looked to the southwest and saw one aircraft attempt to cutoff the other aircraft on downwind to base leg." He further stated that he "saw one of the aircraft attempt to turn out and clipped the other aircraft." This controller did not positively identify each aircraft.

The D25 pilot stated that the tower controller said something to the effect "Watch the Waco, I don't know what he's doing." Another biplane cleared for landing reported the controller "announced that he was not in contact with the Waco and did not know what he was going to do."

#### PERSONNEL INFORMATION:

The airline transport rated pilot and owner of the Fairchild started flying in the late 1940's. He had accumulated 19,660 hours in airplanes, helicopters, and gliders. The pilot rated passenger in the Fairchild held a private pilot certificate and had accumulated 282 hours of flight time.

The private pilot, co-owner of the Waco, flying since the 1980's had accumulated over 5,000 hours and was known for restoration of Waco aircraft. The pilot rated passenger in the Waco held a commercial pilot certificate and had accumulated 2,797 flight hours as of December 1987.

#### AIRCRAFT INFORMATION:

The 1928 Fairchild KR-31 biplane, painted light green with silver wings, was equipped with a Curtis Wright 90 horsepower liquid cooled engine. The 1940 Waco QCF biplane, painted dark green with a colored strip along the fuselage and cream colored wings, was powered by a Continental 220 horsepower radial engine.

Construction of the open cockpit, dual control, biplanes included fabric covered wood wings with flying wires, metal interconnect wing struts, metal cabane struts, and metal aileron interconnects. The Fairchild had wood structured/fabric covered ailerons while the Waco ailerons were constructed of metal. The Fairchild had a 2 bladed wooden propeller and the Waco was equipped with a 2 blade metal propeller. The Fairchild fuselage was wood construction and the Waco fuselage longerons were metal.

The Fairchild was not equipped with an electrical system. The Waco was equipped with navigation lights and an electrical system. The operational status of the lights at the time of the midair collision and the type and status of the avionics equipment installed in the cockpit could not be determined due to post-impact fire damage.

Examination of the biplanes and engines at the site did not reveal any evidence of pre-impact mechanical discrepancies. Review of the Fairchild maintenance records, by the investigator-in-charge, did not reveal any anomalies or uncorrected maintenance defects prior to the flight. Maintenance records for the Waco were never presented to the Board.

#### COMMUNICATIONS:

The Airport Control Supervisor at Bartlesville Municipal Airport, requested a portable Air Traffic Control Tower from the Oklahoma Air National Guard to be used in support of the 1996 National Biplane Association Fly-In. The request was forwarded to the State Aviation Officer and on May 8, 1996, the Airport Control Supervisor, received a letter of authorization from the FAA to furnish temporary air traffic control services at the Bartlesville Municipal Airport on May 31, 1996, through June 2, 1996. The FAA response letter dated May 8, 1996, stated the following: "The temporary tower service is limited to the separation of arriving and departing aircraft using designated landing area/runways only." Control of aircraft moving to, from, and in the parking areas would be the responsibility of the airport management, aircraft operators, and/or the pilots. The letter indicated that any unusual items that might be a factor in the safe operation of aircraft should be brought to the attention of ATC prior to the operation of the tower. The letter indicated that the frequency for ground control was 121.6 and controllers from Tulsa Tower would staff the temporary tower.

The NOTAM was logged at McAlester AFSS on May 8, 1996, for the BVO temporary tower (ATCT) operation. The NOTAM log for May 9, 1996, listed the temporary tower effective on June 1, 1996, from 1300 through 2300 with the local control frequency of 120.0 and ground control frequency of 121.6. The Class E airspace normally effective 1200-0000Z at Bartlesville uses the traffic advisory frequency of 120.0. With the temporary Air Traffic Control Tower in operation, the area around BVO was Class D airspace.

The "Federal Aviation Act of 1958" (Public Law 85-726;72 Stat. 737) created the Federal Aviation Agency to provide the regulation and promotion of civil aviation in such manner as to foster safety and provide for the safe use of the airspace.

The FAA acknowledges safety issues when large numbers of aircraft congregate in close proximity as produced during aviation events, and to this end the FAA publishes advisory circulars. The purpose of Advisory Circular AC-45C, revised in February 1990, is to provide aviation event sponsors and other interested parties with information useful in planning and conducting safe aviation events (airshows, air races, aerobatic contest, parachute demonstration jumps, practice areas designated for aerobatic proficiency or training, and balloon meets and races) including information on the application process for a Certificate of Waiver of the FAR's. The FAA recognized the need for taking a pro-active position in these types of events; however, AC-45C does not specifically address the real and potential safety issues in conducting aviation fly-ins, such as the National Biplane Association Fly-in, that are not being conducted under a Certificate of Waiver. Unofficial accounts of annual aviation events (Fly-Ins) throughout the United States, not operating under an FAA Certificate of Waiver or FAA surveillance, range in the hundreds.

Title 14 CFR Part 1.1 General Definitions defines "Air traffic control" as a service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic. Title 14 CFR Part 91.129 Operations in Class D Airspace states in part:

Each person operating in Class D airspace must establish and maintain communications with the tower while within that airspace."

Class D airspace as defined in The FAA Aeronautical Information Manual (AIM) pertains to the basic flight information and ATC procedures. Chapter 3 Airspace\ Section 2-Controlled Airspace\ 3-2-5 Class D Airspace states in part:

Airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower.

The National Biplane Association sent notification of the Fly-In to over 2,000 association members with arrival information. The notice advised the members to consult the NOTAM and indicated that the airport would not be closed at any time. Tower frequency for the radio arrivals was given as the BVO CTAF 120.0 frequency and pilots were instructed to contact the BVO tower 5 miles from the airport. For no radio arrival, the association information stated the following:

There may be a light gun in use at BVO during the EXPO[SITION]. Sequencing will be the responsibility of the pilot. Right hand pattern for 17; left hand pattern for 35. Straight in and base leg approaches are not permitted.

During interviews with the NBA Chairman of the Board and the Airport Control Supervisor, the investigator-in-charge inquired about the operational status of the control tower. Both indicated that the temporary tower was a "control tower" and therefore compliance in accordance with the FAR's for controlled airspace was expected for departing and arriving aircraft during the entire exposition. These interviews further revealed that neither the NBA nor the airport management had established operating procedures (air to air and air to ground communications, traffic pattern and/or altitudes) for the fly-by period and that on site pilot briefings were neither mandated nor conducted by the NBA or airport management for the scheduled fly-by period from 1330 through 1600. The fly-by was scheduled by the NBA; however, it was not organized by the association and participation was at the discretion of the individual pilots.

Neither the NBA nor the airport management requested assistance from the area FAA Flight Standards District Office (FSDO Oklahoma City, Oklahoma) on setting up traffic flow control separation standards and procedures. FAA FSDO inspectors were not designated to conduct a surveillance of the NBA Fly-in during the non waived event. The NBA Chairman recalled that FAA surveillance was conducted in 1991, 1992, and 1993 in association with a Certificate of Waiver issued for the airshow conducted during the NBA Fly-In.

The NBA Chairman reported that 92 biplanes attended the first NBA Fly-In scheduled in June 1987 and attendance has grown to the worlds largest gathering of biplanes. The biplane attendance increased annually and on June 6, 1996, there were 102 biplanes and 162 non biplanes at the event with 7,000 (pilots and spectators) in attendance. The City of Bartlesville reported hosting "4,000 aircraft and 50,000 people" over the years for the NBA Fly-In.

The Oklahoma Air National Guard representative on site at the temporary tower reported to the investigator-in-charge that he had set up the tower for the FAA controllers. He stated that a light gun was available in the tower. He reported that the tower had transmission recording capabilities; however, this had not been requested and therefore the tower transmissions were not recorded.

Controller interviews were conducted by the investigator-in-charge on June 2, 1996, at Bartlesville. The local controller (frequency 120.0) recalled that there were about 10 airplanes in the airport vicinity at the time of the midair. Neither the number of radio nor no radio aircraft was recalled by the controller; however, he stated that at the time of the midair, neither airplane was in radio communication with the tower and he did not see the impact.

During the interviews, another controller stated that he was helping to spot traffic for the local controller. He saw the Waco on left downwind position for runway 35 and the Fairchild "just past the runway numbers at the left downwind position and one of the aircraft [not identified by the controller] attempt[ed] to turn out and clipped the other aircraft [not identified by the controller] on downwind to base leg." He saw the cream colored airplane spiral to the left at an estimated 70 degrees nose low attitude toward the ground and then observed smoke.

During the interviews, a controller acting as ground support controller and as "a spotter for the local controller" stated that he heard another controller in the temporary tower call out "midair" and he called the airport advisory personnel who were already calling 911. He further stated that he was concerned about the "no radio Waco flights throughout the fly-in as they did not know what the Waco was going to do when it was in the air."

During the interviews, the controllers upheld the position that they were staffing the BVO "advisory" frequency from the temporary tower and the tower was placed on the ramp to enhance visibility. The controllers stated that the light gun signals had been utilized during no radio aircraft fly-bys; however, when used, the light signal was to "advise the pilot that it appeared to the controllers that it was safe" for the pilot to carry out his intentions whether it was a landing or a fly-by. The light gun was not being used at the time of the midair.

Air Traffic Control Order 7110.65J pertains to the operational responsibilities of the controllers. Chapter 2 Paragraph 2-1-2 (b) states in part:

THE PRIMARY PURPOSE OF THE ATC SYSTEM IS TO PREVENT A  
COLLISION BETWEEN AIRCRAFT OPERATING IN THE SYSTEM AND TO  
ORGANIZE AND EXPEDITE THE FLOW OF TRAFFIC.

Chapter 3 Paragraph 3-1-1 states in part:

WHEN OPERATING IN ACCORDANCE WITH TITLE 14 OF THE CODE OF FEDERAL REGULATIONS, IT IS THE RESPONSIBILITY OF THE PILOT TO AVOID COLLISION WITH OTHER AIRCRAFT. HOWEVER, TRAFFIC INFORMATION CAN AID PILOTS IN AVOIDING COLLISION BETWEEN AIRCRAFT OPERATING WITHIN CLASS D AIRSPACE.

Chapter 3 Section 2 Paragraph 3-2-1 states in part:

USE AIR TRAFFIC CONTROL SIGNALS TO CONTROL AIRCRAFT WHEN RADIO COMMUNICATIONS CANNOT BE EMPLOYED.

Chapter 3 Section 2 Paragraph 3-2-2 states in part:

DIRECT A GENERAL WARNING[LIGHT] SIGNAL TO AIRCRAFT, APPROPRIATE WHEN: a. Aircraft are converging and a collision hazard exists.

Chapter 3 Section 8 Paragraph 3-8-1 states in part:

ESTABLISH THE SEQUENCE OF ARRIVING AIRCRAFT BY REQUIRING THEM TO ADJUST FLIGHT OPERATION AS NECESSARY TO ACHIEVE PROPER SPACING.

#### WRECKAGE AND IMPACT INFORMATION:

Numerous wood rib and wing spar fragments (midair collision site) were found approximately 1/4 mile from the approach end of runway 35. The upper left wing outboard (4 feet) section of the Fairchild and the lower left wing aileron of the Waco were found near the vicinity of the wood fragments. The Fairchild came to rest 180 feet from the site and the Waco was found resting 400 feet from the collision site. One tree in the vicinity of the Waco had a tree branch that was broken and resting against the ground. See the enclosed diagram for additional details.

During the examination of the Fairchild, the lower left wing outboard section (6 feet) of the Waco was found between the left wings of the Fairchild. The left wing interconnect struts of the Fairchild were buckled outward. Thirty inches of the front spar of the upper left wing remained attached to the airframe and the remainder of the spar was broken into numerous pieces. The rear spar of the upper left wing was broken approximately 6 feet from the outboard tip and approximately 5 feet from the center section spar joint. The left wing ailerons remained attached at the pushrod ends.

Destruction of the Waco by the post-impact fire precluded examination of the cockpit components and portions of the airframe. One propeller blade that exhibited bending and

twisting had separated from the engine and an attached propeller blade was twisted inboard of the tip. According to an acquaintance, the "pilot had recently replaced a rigging roll wire." No physical evidence of wire discrepancies was found. The lower left wing aileron did not exhibit fire damage. The upper left wing aileron and the lower right wing aileron showed fire damage. The upper right wing aileron of the Waco was not located at the site; however, the extent of the fire does not preclude the possibility of total destruction.

**MEDICAL AND PATHOLOGICAL INFORMATION:**

The Office of the Chief Medical Examiner of Tulsa, Oklahoma, performed the requested autopsies on the rear seat (PIC) cockpit occupants. The FAA Civil Aeromedical Institute (CAMI) of Oklahoma City, Oklahoma, performed the toxicological testing on the rear seat (PIC) cockpit occupants. Toxicology for the airline transport pilot in the rear seat (PIC) of the Fairchild was negative. The toxicology for the private pilot in the rear seat (PIC) of the Waco was positive for hydrochlorothiazide. According to Dr. Soper of the FAA CAMI, the "hydrochlorothiazide (diuretic) detected in liver and lung fluid, is insignificant." The medical examiner at Tulsa reported that microscopic sections of trachea of the pilot rated passenger in the front seat of the Waco showed "no identifiable deposition of soot on the surface of the mucosa."

**ADDITIONAL INFORMATION:**

The airplanes were released to the owner's representatives.

**Pilot Information**

<b>Certificate:</b>	Airline Transport; Commercial	<b>Age:</b>	71, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	Glider; Helicopter	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Glider; Instrument Airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	08/24/1995
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	19660 hours (Total, all aircraft), 283 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

Aircraft Make:	Fairchild	Registration:	N7780
Model/Series:	KR-31 KR-31	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	223
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	04/26/1996, Annual	Certified Max Gross Wt.:	2078 lbs
Time Since Last Inspection:	2 Hours	Engines:	1 Reciprocating
Airframe Total Time:	1678 Hours	Engine Manufacturer:	Curtis Wright
ELT:		Engine Model/Series:	OX-5
Registered Owner:	WILLIAM F. WATSON	Rated Power:	90 hp
Operator:	WILLIAM F. WATSON	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	BVO, 713 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	1346 CST	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 2000 ft agl	Visibility	15 Miles
Lowest Ceiling:	Broken / 25000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	340°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	23° C / 16° C
Precipitation and Obscuration:			
Departure Point:	(BVO)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1345 CST	Type of Airspace:	Class D

## Airport Information

Airport:	BARTLESVILLE MUNICIPAL (BVO)	Runway Surface Type:	Concrete
Airport Elevation:	713 ft	Runway Surface Condition:	Dry
Runway Used:	35	IFR Approach:	
Runway Length/Width:	6200 ft / 100 ft	VFR Approach/Landing:	Traffic Pattern

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	

## Administrative Information

<b>Investigator In Charge (IIC):</b>	JOYCE M SMITH
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### Additional Participating Persons:

<b>Investigation Docket:</b>	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .
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