

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted December 27, 1951

Released: January 3, 1952

ROCKY MOUNTAIN AIR SHOWS, INC.—FLAGLER, COLORADO, SEPTEMBER 15, 1951

THE ACCIDENT

A Timm aircraft, model NZT-1, N-56308 (Experimental) crashed on the Flagler Airport, September 15, 1951, at about 1440 MST. The pilot, sole occupant of the aircraft, was killed as were 19 spectators. Ten persons were seriously injured and the aircraft was demolished.

EVENTS PRECEDING THE ACCIDENT

Each year the community of Flagler, Colorado, holds a festival for residents of the surrounding area. During August 1951, the town leaders desired to have an air show at the local airport as the feature of the festival. Accordingly, they consulted Mr. Nelson W. Stake, the airport manager. Mr. Stake in turn contacted Mr. W. D. Madsen, president of Rocky Mountain Air Shows, Inc., a promoter of air shows, at Denver, Colorado, and asked if he could stage the show. Mr. Madsen replied that he could and, after agreement as to price, tentatively arranged for a number of air show acts. He then prepared an "Application for Certificate of Waiver," listing the acts by name, the aircraft to be used and the pilots who were to fly. Included in the list were a demonstration of acrobatic flight by a powered aircraft, acrobatic flight by a sailplane, a rope ladder act, a demonstration of remotely (radio) controlled aircraft and finally, a low simulated dive bombing attack on a hut erected on the airport for this specific purpose. This application he sent to Mr. Stake at Flagler for completion by Mr. Stake as a party to whom the waiver would be issued. Mr. Stake added the necessary data and carried the application to Mr. A. C. Goddard, Aviation Safety Agent, Civil Aeronautics Administration, Denver, Colorado.

There he discussed with Mr. Goddard a number of phases of the proposed air show and was informed that the waiver might be granted after the Civil Aeronautics Administration learned more details concerning the program. On Monday, September 10, Mr. Madsen came to the CAA office and advised that he had been hired to put on the air show. Mr. Goddard pointed out the recent thinking of the Civil Aeronautics Administration which questioned the public value of such air shows in general unless the utmost safety measures were enforced. However, air shows had not been prohibited and the result of the conversation, after considerable discussion between Messrs. Madsen and Goddard relative to safety measures and the CAA's desire to exercise every precaution, and to participating personnel and aircraft, was that the waiver of Civil Air Regulations 60.16(d), 60.17(c) and 60.18(c) was issued on Tuesday, September 11, 1951. In waiving these regulations, the Administration incorporated in the certificate the following special provisions applicable to the conduct of the air show:

- 1. No aircraft engaged in operations under the terms of this certificate of waiver shall be flown toward, over or within 500 feet horizontally of the spectators.
- 2. Flight visibility must be at least three miles during acrobatic flights.
- 3. No acrobatic flights shall be conducted at less than 500 feet vertically and 2,000 feet horizontally from any cloud formation.
- 4. A standard closed field signal (large white X) shall be prominently displayed on

<sup>2</sup>A circular letter dated August 1, 1951, to the CAA Regional Administrator of all Regions from the CAA's Director, Office of Aviation Safety (See attachment).

<sup>3</sup>60.16(d) Acrobatic flight below altitude of 1500 feet above the surface. 60.17(c) Minimum safe altitudes over other than congested areas. 60.18(c) Operation on and in the vicinity of an airport.

<sup>1</sup>All times referred to herein are Mountain Standard and based on the 24-hour clock.

the landing area at all times when the air meet is in progress. This signal shall be of sufficient size to be readily seen and read from an altitude of 3,000 feet above the landing area.

5 Adequate provisions shall be made for the parking of automobiles and visiting aircraft within definite prescribed areas, so located as to preclude any aircraft operation, under the terms of this certificate of waiver, toward, over, or within five hundred feet horizontally of such areas.

6 Adequate provisions shall be made for the proper control of spectators to insure that they will remain within the prescribed areas at all times when the air meet is in progress.

7 A physical barrier shall be provided to define the boundaries of the spectator areas and to assist policing personnel to confine spectators within such areas.

8 A suitable signal shall be provided to inform all participants (both in the air and on the ground) that the air show has been halted, in case such action should become necessary.

9 The air show shall be immediately halted if unauthorized persons enter the operations area, or, if for any other reason such action is necessary in the interest of safety.

10 A representative authorized to act for the air meet management shall be immediately available at operations headquarters at all times while the air meet is in progress.

11 A deadline, readily visible to the participants, shall be provided to insure the minimum spacing between spectators and participating aircraft as shown in special provision Number 1, above. (NOTE: Runways or other clearly defined lines of demarcation if suitable (suitably) located, may be utilized for (for) this purpose.)

12 Prior to the beginning of the air meet all pilots participating shall be thoroughly briefed on all special field rules, manner and order of events, and all provisions of this certificate of waiver.

13 All acrobatic maneuvers shall be completed 500 or more feet above the surface of the ground.

14 All programmed flights shall be parallel to and/or at least 500 feet horizontally from the spectator area.

These special provisions were thoroughly discussed and understood by Mr. Madsen.

On Thursday, September 13, Mr. Madsen phoned Mr. Goddard and asked to have the name of another pilot, Lt. Norman L. Jones, United States Air Force, Lowry Air Base, Denver, Colorado, also a commercial pilot, added to the waiver as an acrobatic pilot as neither of two other pilots listed for acrobatics would be available. Mr. Goddard complied (by adding Jones' name to his own file copy of the waiver inasmuch as the original had been mailed to Mr. Stake) and informed Mr. Madsen that although the waiver specified a 500-foot horizontal distance from spectators, that at the pilot briefing, scheduled at the Flagler Airport before the start of the air show, he would request that the distance be increased to one-half mile, to which Mr. Madsen agreed.

On Saturday, September 15, the day of the air show, Mr. Goddard and another CAA Agent flew to Flagler, arriving about 1035. They ascertained that provisions of the waiver relative to ground safety measures had been met. Mr. Madsen, the promoter, arrived at the airport sometime before 1230. Neither the sailplane nor the acrobatic aircraft had arrived and at about 1320 Mr. Madsen telephoned his base airport at Denver. He learned that one act, a Waco aircraft with a sailplane (glider) in tow, had left for Flagler at 1310 and that the acrobatic aircraft, a Timm, piloted by Lt. Jones, was about to leave.

At about 1420 the sailplane and its tug arrived in the vicinity of the Flagler Airport. Its pilot, F. W. Ruble, cut loose at an altitude of about 2,000 feet and performed a number of acrobatic maneuvers. He then dove downwind along the north-south runway (the wind was from the north at about 18 miles per hour, causing a slight turbulence, and the weather was clear) and at an altitude of about 50 feet, pulled up, made a "split S" and landed into the wind on the south-north runway. The sailplane was then removed from the runway and its towplane shortly landed and was parked.

About 1440, the Timm arrived south of the field at an elevation of approximately 500 feet, and flew north toward the south-north runway. The plane laid a smoke trail as it approached the south end of the field at an estimated altitude of approximately 150 feet.

At a point opposite the south end of the hangar, and while directly over the south-north runway, the aircraft started a slow roll to the right. Its horizontal distance from the spectators' roped off area was about 100 feet. Upon reaching the inverted position, the nose of the aircraft dropped and the line of flight was altered to the right approximately 30 degrees toward parked automobiles and spectators. The pilot was completing his roll when the left wing struck the ground and the aircraft crashed into spectators and automobiles. The accident resulted in death to Lt. Jones and 19 persons on the ground, and serious injuries to 10 others. A number of vehicles were extensively damaged, and the aircraft was demolished.

#### INVESTIGATION

The incompleting slow roll that resulted in this accident was started at an altitude variously estimated at about 150 feet, and was improperly executed inasmuch as the aircraft lost altitude while inverted and slipped into the ground when the roll was nearly completed. Well qualified witnesses, including the two previously mentioned CAA agents, confirm the above.

Examination of the aircraft wreckage indicated that immediately after the left wing tip struck the ground, the nose of the aircraft struck a number of automobiles, parked three deep, and continued along the two outer rows for about 125 feet. The aircraft disintegrated and its parts were strewn along the 125 feet over a width of about 40 feet. About the only sizeable part of the aircraft holding together was the last four feet of the fuselage, still attached to the empennage.

The engine and its attached propeller had carried away with the engine mount and front bulkhead of the fuselage. Propeller blade distortion indicated that power was being developed at the time of impact, the propeller was in low pitch. The pilot was wearing a parachute and had his safety belt fastened. The safety belt had pulled both of its anchors from the fuselage structure.

Investigation disclosed no evidence of any failure of the aircraft's structure, controls, or powerplant prior to impact. The rudder trim tab was set about 10 degrees

to the left. The right elevator trim tab was found in the 30-degree "up" position.

The glue bonds connecting the rear bulkhead of the fuselage to the longerons and fuselage skin were examined minutely. Although some deterioration of the glue bonds was noted in this area, there was no indication that this condition had resulted in any malfunctioning of the aircraft prior to the accident.

The subject aircraft was a Timm N2T-1, N-56308 (Experimental) owned by Rocky Mountain Air Shows, Inc., Denver, Colorado. It was a two-place open land monoplane built in 1942 as a Navy trainer. Subsequent to the war, it was sold by War Assets Administration. It was then given an NC (Commercial) type certificate which was maintained until June 1950. At that time it was overturned on the ground during a windstorm with resulting damage to the propeller, vertical stabilizer and rudder. Following repairs the owner had a 300-horsepower Lycoming engine installed replacing the 225-horsepower Continental with which the aircraft had originally been powered. It was then, on September 13, 1951, two days before the accident, certificated in the experimental category for "Exhibition Flights." The engine was not carbureted for inverted flight.

The aircraft was test flown on the same day by the aircraft and engine mechanic (and pilot) who had supervised the installation of the Lycoming engine. He pronounced the flight characteristics as satisfactory, adding that it was necessary to carry a slight amount of "up" elevator trim to offset nose heaviness. He performed no acrobatics. Lt. Jones first flew the aircraft the day before the accident. Ground witnesses saw him do a number of maneuvers, not including slow rolls, and also saw him "fall out of a loop," as if the loop was performed improperly. Later the same day the aircraft was again flown by a third pilot who went through a number of maneuvers, including slow rolls, he stated that the aircraft's performance was satisfactory.

The pilot, Lt. Jones, age 29, was a First Lieutenant, United States Air Force, based at Lowry Air Force Base, Denver, Colorado. Air Force records showed his recent military flying had been in bombers, there appears to be no record of his having flown small

aircraft, acrobatically, for a considerable time. Records indicate that his total piloting time was approximately 2,500 hours in various types of military and civil aircraft. He held a commercial pilot certificate, No. C-409320, with several ratings, including the appropriate one for the Timm aircraft. This certificate was currently effective on the day of the accident. Although this certificate authorized him to fly civil aircraft, United States Air Force Regulations require a military pilot to obtain permission of his Commanding Officer to fly other than military aircraft.<sup>4</sup> Lt. Jones had not obtained this permission.

The show promoter, Mr. Madsen, testified that he had met Lt. Jones only a few days before the accident at Lowry Air Force Base where Mr. Madsen was employed as a civilian instructor at the photographic school. According to Madsen, Lt. Jones had told him that he had performed at civil air shows previously. Madsen was satisfied with Lt. Jones' seeming ability and thereupon engaged him to do the acrobatic exhibition at Flagler.

Evidence indicates that Lt. Jones' only experience with the subject aircraft, prior to the flight from Denver to Flagler, was for some 30 minutes on the day before the accident. Evidence also indicates that he had intended to practice acrobatics while en route from Denver to Flagler, a distance of about 110 miles, but there is no evidence that he did or did not do so. Investigation discloses that both the Waco aircraft (towing the sailplane) and the Timm experienced mechanical difficulties (both were oil leaks) accounting for their late departure for Flagler, where they were due prior to 1300 so that pilots could have a final briefing depending upon current weather conditions and other factors.

Mr. Madsen testified that he admonished Lt. Jones about adhering to the 500 foot minimum altitude for the conclusion of all acrobatics and the 500-foot minimum horizontal distance from the spectator area as well as the necessity of landing at Flagler, for briefing, prior to the start of the show.

The pilot of the sailplane, however, contradicted Mr. Madsen's testimony in that he averred that he was instructed by Mr. Madsen

that in the event of arriving late at Flagler he was to go into his act immediately, which he did. Lt. Jones, also a late arrival, likewise started acrobatics immediately upon arrival at Flagler.

#### ANALYSIS

The precise control of altitude during a slow roll requires piloting skill, current acrobatic experience and current pilot familiarity with the aircraft. Lt. Jones must have acquired the first of these during his military flying training. However, because his piloting experience in the subject aircraft had been only about 30 minutes on the day before the accident, and about one hour while en route to Flagler from Denver, he certainly was not familiar with the aircraft. Furthermore, the record indicates that he had not flown acrobatically for more than a year. The accident, therefore, can be charged only to pilot error, entirely apart from the fact that the maneuver was attempted at an altitude far below that authorized in the waiver, and far closer to the spectators than the waiver specified.

As previously stated in this report, the testimony of Ruble, the sailplane pilot, and Madsen, the promoter of the show, is conflicting as to the final instructions. Ruble stated that he was given telephone instructions to go into the act prior to landing if he was late in arriving at Flagler. Madsen denied this, however, both the sailplane's pilot and the Timm's pilot, did start acrobatic maneuvers immediately upon arrival, and before landing.<sup>5</sup> The Board therefore concludes that such instructions, either direct or implied were given by Madsen to both pilots, in direct conflict with the terms of the waiver. Had Pilot Jones first landed, as required, the great and tragic loss of lives caused by this accident might have been averted.

Although the air show waiver was issued to airport operator Stake, there is nothing in the record to indicate that he was derelict in his duty or acted in bad faith. In fact, all ground safety precautions had been taken, including the roping off of the spectator area, the presence of an ambulance,

<sup>4</sup>United States Air Force Regulations 60-1 and 60-1A

<sup>5</sup>Pilot Ruble's flight certificate was subsequently suspended by the Civil Aeronautics Administration. At the time of the accident Madsen held no CAA certificate.

and the installation of a public address system

The Administrator of Civil Aeronautics, on September 21, 1951, six days after the accident, announced a new policy under which certificates of waiver of the air traffic rules will be issued for air races, air meets and similar aeronautical demonstrations only when it is shown that such activities will contribute directly to the advancement of, and public confidence in, aviation

The new Civil Aeronautics Administration policy does not rule out air shows entirely, but does ban certificates of waiver for those which include acrobatics not under direct radio control provided by the certificate holder, delayed parachute jumping, dog fighting, "crazy" flying, intentional aircraft crashes, and similar unusual and hazardous types of aircraft operation. He stated that he does not feel that it is good public policy to authorize departures from the carefully framed Civil Air Regulations solely for the sake of thrills

Where some constructive purpose is served, CAA will continue to issue waivers, but otherwise, the standing regulations of the Civil Aeronautics Board, issued after consultation with the aviation industry, will be enforced by the CAA without exception

**FINDINGS**

On the basis of all available evidence, the Board finds that

-38842

1 The pilot was properly certificated but did not have military permission to fly the civil aircraft

2 The aircraft was properly certificated

3 The air show waiver of the Civil Air Regulations was properly issued and valid

4 Air show promoter Madsen failed to have his performers properly briefed, thereby violating the terms of the waiver

5 The pilot of the Timm aircraft did not comply with the terms of the waiver

6 The accident resulted in death to the pilot and 19 spectators, serious injuries to 10 others, destruction of the aircraft and damage to a number of parked vehicles

**PROBABLE CAUSE**

The Board determines that the probable cause of the accident was the pilot's loss of control of the aircraft during an attempted slow roll closer horizontally to the spectators and at an altitude lower than specified in the waiver in utter disregard of the safety of persons and property on the ground

BY THE CIVIL AERONAUTICS BOARD

/s/ DONALD W NYROP

/s/ OSWALD RYAN

/s/ JOSEPH P ADAMS

Josh Lee and Chan Gurney, Members of the Board, did not participate in the adoption of this report

# Supplemental Data

## INVESTIGATION AND HEARING

The Civil Aeronautics Board received notification of the accident shortly after 1730, September 15, 1951, from the Civil Aeronautics Administration office at Denver, Colorado. An investigation was immediately initiated in accordance with Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. As part of the investigation a public hearing was held in the American Le-

gion Building, Flagler, Colorado, on October 4, 1951.

The Commanding Officer, Lowry Air Force Base, Denver, Colorado, also immediately conducted an investigation of the circumstances concerning Lt Jones' participation in the air show, and cooperated fully with the Civil Aeronautics Board in the investigation of the accident.

DEPARTMENT OF COMMERCE  
CIVIL AERONAUTICS ADMINISTRATION  
WASHINGTON 25, D C

August 1, 1951

## CIRCULAR LETTER

TO Regional Administrator, All Regions

FROM Director, Office of Aviation Safety

SUBJECT Policy Governing Acts Participating with Air Shows

The Administrator has expressed his concurrence with a policy to deny the participation of death-defying thrill-type acts in air shows. The attached copy of a memorandum, dated May 11, 1951, indicates the manner in which the most recent request for a crash act was handled.

In the last few months we have received two applications for approval of similar performances. One was for authorization to participate in the Miami Air Show, and the other was in connection with a series of air shows throughout the country. Both acts involved the crashing of aircraft, and both were denied.

It is not our desire to eliminate air shows, but rather to withdraw pointless and unnecessarily dangerous stunts performed with aircraft. It is desired to place more emphasis on air-fair type of shows with demonstrations of the dependability and utility of aircraft, piloting skill in normal flying, ground static displays, and only high quality acrobatics. We believe it is necessary not only to eliminate undesirable types of acts, but to apply certain minimums to govern all aerial performances and possibly to establish airman qualifications for the participating non-professional pilot. Professional stunt pilots may be capable of conducting acrobatics safely at low altitudes, whereas the same acts would be extremely dangerous at these altitudes for the inexperienced pilot. Also, we are cognizant of the fact that there are professional pilots who are prone to take unnecessary chances for the sake of providing additional thrills for the crowd, unless these performances are standardized and kept within certain limits.

We wish to devise standards that will not restrict the professional stunt pilot too severely, and at the same time, provide a good aerial show with a reasonable degree of safety for both professional and non-professional pilots. For example, it is suggested that, regardless of the pilot experience, no inverted flight should be permitted below an altitude of perhaps 75 or 100 feet, that wing walking and stunts, such as climbing in and out of aircraft in flight, slow rolls on take-off, or human pick-up from automobiles, speed boats, etc., should not be allowed.

Another suggestion is to establish a list of pilots approved for air show waivers. Presumably, each region would make an initial list of the professional and the experienced non-professional pilots recommended by the field agents. A composite list would be furnished to the regions by the Washington office. Thereafter, names would be added to the list only after a demonstration of the pilot's ability to the satisfaction of an agent. Uniform standards would have to be established to be used in determining the applicant's qualification for such a list. The purpose of the list would be to prevent unnecessary flight demonstrations in establishing pilots' qualifications for air show work.

In order to establish satisfactory standards acceptable to all regions, your comments and specific recommendations are requested concerning the types of acts which should be allowed, minimum standards which should be made applicable to the professional, as well as standards for the non-professional, acrobatic pilot, and any other suggestions of a general nature that would be beneficial to such a program. We would appreciate having the comments of field agents consolidated by the regional office before forwarding to Washington, so as to reflect the regional recommendations

It is anticipated that related policy matters will be publicized through the proper channels and supplemented by instructions in the Manual of Procedure

Your attention to this matter within the next 60 to 90 days would be desired

/s/ E. S. HENSLEY  
E S Hensley, W-270

Attachment

-38842

May 11, 1951

TO Regional Administrator, Region Two  
FROM Director, Office of Aviation Safety  
SUBJECT Air Show Waivers

Reference is made to a memorandum dated April 30, 1951, from Chief, Safety Operations Division, requesting our policy concerning the approval by the Civil Aeronautics Administration of aircraft-crash acts and other thriller-type performances, when issuing air show waivers

While it is true that in the past we have authorized some acts of this nature, there has always been doubt as to the adequacy of safety precautions to cope with the unpredictable behavior of flying parts, such as a propeller blade which might be thrown clear of the wreckage toward or into a crowd. In addition, it is doubtful that such acts foster and promote aviation. We are of the opinion that in the interest of safety and in view of our responsibility to promote aviation, we should not give official authorization for such performances

It is felt timely to stop these pointless uses of aircraft in connection with air shows or any other form of entertainment. However, it is not intended to discourage other types of acrobatics, provided reasonable precautions are taken to assure a high degree of safety

Manual of Procedure material is now being prepared which will establish this policy on a national basis

/s/ E S HENSLEY  
E. S Hensley, W-270