



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: November 1, 2012

In reply refer to: A-12-64 through -67

The Honorable Michael P. Huerta
Acting Administrator
Federal Aviation Administration
Washington, DC 20590

Many airplanes are equipped with ejection seats, ballistic recovery systems (BRS),¹ and inflatable restraints² that contain explosive components to activate the safety devices, and the number is increasing as newly certificated aircraft with BRS and after-market inflatable restraints become more prevalent.³ The five accidents discussed below are examples of accidents that the National Transportation Safety Board (NTSB) has investigated in which the presence of these devices on the accident aircraft was not initially known to those on scene. Although none of these accidents resulted in injuries or fatalities to first responders or accident investigators due to postaccident activation of the explosive components in these safety devices, these explosive components, if they remain charged and are unknown to first responders and investigators, pose a high level of risk to those working in and around the aircraft wreckage.

On January 20, 2012, about 1818 central standard time, an experimental exhibition airplane, an Aero Vodochody L39C, N16RZ, collided with trees while maneuvering near Rainbow City, Alabama.⁴ The certificated airline transport-rated pilot was fatally injured. The airplane sustained substantial damage and a postcrash fire. The airplane was registered to Fighter Town USA, LLC, and operated by the pilot under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 as a personal flight. Instrument meteorological conditions (IMC) prevailed for the flight, which operated on an instrument flight rules (IFR) flight plan. The flight originated from Northeast Alabama Regional Airport, Gadsden, Alabama, about 1817.

¹ A BRS is a solid-fuel rocket, housed in or on the fuselage, used to pull a parachute out from its housing and deploy the canopy full within seconds.

² Inflatable restraints include airbag restraining systems that are incorporated into seatbelts and shoulder harnesses and that inflate under high gas pressure during accidents. The compressed gas, up to 6,000 psi, is stored in a cylinder(s) underneath the seats.

³ Airplanes equipped with ejection seats include some vintage ex-military aircraft used as experimental exhibition aircraft. Airplanes equipped with BRS and inflatable restraints include Cirrus and Flight Design, Cessna 100 series, and special light sport aircraft.

⁴ Preliminary information about this accident, NTSB case number ERA12FA149, is available online at <http://www.nts.gov/aviationquery/index.aspx>.

The NTSB investigator-in-charge (IIC) was informed via telephone by the first responder, a law enforcement officer, that the pilot might have ejected from the airplane before the crash. The first responder later informed the IIC that the pilot was still in the ejection seat and that the seat had not been fired. The IIC told the officer not to allow any recovery of the pilot's remains until the pilot's ejection seat could be deactivated and the rear ejection seat with its explosive component could be located. The IIC, along with experts from the airplane's maintenance facility, located both ejection seats and disarmed the explosive components by cutting the appropriate wires. The associated explosive charges, located under the seats, were removed, placed in an appropriate container, and given to the law enforcement bomb squad for safe disposal. The first responders and the IIC did not find any warning placards on the exterior of the airplane about the danger of the explosive components in the ejection seats.⁵

On May 30, 2010, about 0845 central daylight time, a special light sport airplane (S-LSA), an Aveko LV-3, N801GB, collided with terrain and trees after a loss of control near Boyd, Texas.⁶ The certified flight instructor and the student pilot were seriously injured, and the airplane sustained substantial damage. The airplane was registered to and operated by Denco Remodeling Group, Inc., under the provisions of 14 CFR Part 91 as an instructional flight. Visual meteorological conditions (VMC) prevailed for the flight, and no flight plan was filed. The flight originated from Hicks Airfield, Fort Worth, Texas, about 0815.

A Federal Aviation Administration (FAA) inspector initially conducted an on-scene examination of the wreckage and provided a description of the accident site via telephone to the NTSB IIC, who informed the FAA inspector that many S-LSAs are equipped with a BRS. The FAA inspector stated that he had walked around the airplane wreckage, inspected the cockpit area, and saw a parachute that had not deployed and remained in its compartment behind the pilot's seat. The FAA inspector added that he, and most likely the fire department, had conducted their inspection and work without the knowledge that the airplane was equipped with a BRS that contained an explosive component. Further examination of the BRS revealed that the rocket motor, which is used to deploy the parachute, had failed to deploy the parachute and was found discharged on the rear floor of the airplane. An external cover panel that is used to cover the parachute was not in place and was not located in the wreckage area. The aircraft's distributor stated that a warning placard should have been on the missing cover plate. Although the exterior of the airframe should have had a warning placard (as required) about the potential danger of the explosive component in the BRS to first responders, the exterior of the airframe did not have such a warning placard.

On March 16, 2007, about 1443 eastern daylight time, an Aero Vodochody L-39C Albatros, N63925, crashed while performing at the Tico Warbird Airshow, Space Coast Regional Airport (TIX), Titusville, Florida.⁷ The airline transport-rated pilot, the sole occupant of the airplane, was fatally injured, and the airplane was destroyed. The airplane was registered to and operated by Best Jet Services, LLC, under the provisions of 14 CFR Part 91 as an air

⁵ The airplane had a warning placard; however, the placard was destroyed by the postcrash fire.

⁶ The report for this accident, NTSB case number CEN10FA277, is available online at <http://www.nts.gov/aviationquery/index.aspx>.

⁷ The report for this accident, NTSB case number MIA07FA060, is available online at <http://www.nts.gov/aviationquery/index.aspx>.

show flight. VMC prevailed for the flight, and no flight plan was filed. The flight originated from TIX about 1430.

The first responders and the NTSB IIC did not initially know that ejection seats that contained explosive components were installed on the airplane. However, during the on-scene investigation, burnt and fragmented sections of the airplane's two ejection seats and cockpit canopy exhibited characteristics consistent with the presence of explosive components. As a result, the NTSB IIC halted the investigation and requested assistance from members of the Titusville Police Bomb Disposal Unit. The Titusville Police Department consulted with Patrick Air Force Base's explosive ordinance disposal (EOD) team, which confirmed that the seats and canopy were armed with explosive components. EOD personnel removed the explosive components from the accident scene and neutralized the explosive charges.

On January 15, 2005, about 1223 eastern standard time, a Cirrus Design Corporation SR22, N889JB, impacted a house and terrain in Coconut Creek, Florida.⁸ The certificated commercial pilot was fatally injured, and the airplane was destroyed. The airplane was registered to Jerry Ballard Homes, Inc., and operated by the pilot under the provisions of 14 CFR Part 91 as a personal flight. IMC prevailed for the flight, which was operating on an IFR flight plan. The flight originated from Fort Lauderdale Executive Airport, Fort Lauderdale, Florida, about 1217.

FAA personnel contacted the NTSB IIC moments after receiving a call from a Florida state trooper who was at the accident scene. During a conference call with all three representatives, the FAA representative looked up the accident airplane's registration number on the FAA's online aircraft registry. Although no information regarding the presence of safety devices that contained explosive components was found on the website, the NTSB IIC recognized that the make and model of the airplane was likely equipped with a BRS. The NTSB IIC informed the Florida state trooper to alert the first responders, who were just starting to fight the fire, that the airplane was equipped with a BRS, which has an explosive component. As a result, the firefighters immediately changed their fire suppression techniques and took additional safety precautions.

On June 16, 2001, about 1438 central daylight time, a Cirrus Design Corporation SR22, N739BB, crashed during a go-around attempt on runway 20 at Springfield-Branson Regional Airport (SGF), Springfield, Missouri.⁹ The private pilot and the rear-seat passenger sustained minor injuries; the front-seat passenger was seriously injured. The airplane was destroyed. The airplane was registered to and operated by the pilot under the provisions of 14 CFR Part 91 as a personal flight. VMC prevailed for the flight, and no flight plan was filed. The flight originated from Chariton Municipal Airport, Chariton, Iowa, about 1316.

Aircraft rescue and firefighting (ARFF) personnel arrived on scene about 2 minutes after the accident. The airplane was equipped with a BRS, which did not deploy before or during the accident. A firefighter who responded to the scene stated that emergency workers did not

⁸ The report for this accident, NTSB case number IAD05FA032, is available online at <http://www.nts.gov/aviationquery/index.aspx>.

⁹ The report for this accident, NTSB case number CHI01FA169, is available online at <http://www.nts.gov/aviationquery/index.aspx>.

initially notice the warning placards on either side of the aft fuselage warning of the dangers of the explosive component in the BRS and indicating that the airplane was equipped with a rocket for parachute deployment. However, during fire suppression activities, another worker who recognized the airplane make and model alerted other firefighters to the potential hazard. After the accident, SGF's assistant director of aviation expressed concerns that existing warning labels on Cirrus Design Corporation airplanes do not provide emergency workers with sufficient notice that a possible hazardous device is located on the aircraft.¹⁰

The NTSB is concerned that, in these accident investigations, the first responders and sometimes the investigators did not initially know that the accident airplanes were equipped with safety devices that contain explosive components. In some cases, they began performing rescue, fire suppression, and accident investigation activities that might have inadvertently activated the explosive component, posing a great risk of injury. Had they known that safety devices that contained explosive components were installed on these aircraft before they performed their emergency response and investigative duties, they could have taken appropriate actions to minimize the risk of injury. Although in the Springfield, Missouri, accident the airframe's exterior had a warning placard about the BRS, the first responders did not notice the warning placard. While some aircraft have placards warning about the danger of explosive components in safety devices installed on the aircraft, these placards can be easily damaged, distorted, burnt, and obscured during crash sequences, making them indiscernible among the wreckage, as in the Rainbow City, Alabama, accident. Also, safety devices containing explosive components can easily be dislodged from their securing structures during the crash sequence and thrown away from their installed locations on the aircraft where the warning labels are attached, as in the Boyd, Texas, accident. This increases the chances of a first responder or investigator inadvertently coming into contact with the explosive components if they are unaware of the existence of the device on the aircraft. Thus, warning placards, while certainly helpful in some instances, should not be the only means to warn first responders and investigators of the presence of safety devices that contain explosive components on aircraft.

First responders and accident investigators can get pertinent information about aircraft, including the type, make, model, and equipment installed,¹¹ before arrival at an accident scene by accessing the FAA's online aircraft registry database¹² and entering the aircraft's registration number.¹³ However, the FAA's online aircraft registry does not contain information about safety devices that contain explosive components installed on aircraft. In the case of the Coconut Creek, Florida, and Rainbow City, Alabama, accidents, timely information provided by a knowledgeable investigator about the presence of explosive components alerted the first responders to take appropriate safety measures. The NTSB concludes that, if information about

¹⁰ On April 29, 2004, the NTSB issued Safety Recommendation A-04-39, which asked the FAA to "work with Ballistic Recovery Systems, Inc., Cirrus Design, the National Fire Protection Association, and the airport rescue firefighting working group to establish design requirements for warning labels and exterior markings for airplanes equipped with ballistic parachute systems that meet the American National Standards Institute's guidelines (ANSI Z535.4) for conspicuity, coloration, visibility, and content." On February 1, 2011, Safety Recommendation A-04-39 was classified "Closed—Acceptable Action."

¹¹ Examples of the equipment that would be noted include the type of engine and any extra fuel tanks installed.

¹² The FAA's online aircraft registry database can be accessed at <http://registry.faa.gov/aircraftinquiry/> (accessed June 13, 2012).

¹³ The aircraft's registration number is visible on the outside of the aircraft (on the vertical fin or on the empennage).

safety devices that contain explosive components on aircraft were available to first responders and accident investigators in the FAA's online aircraft registry, first responders and investigators will have knowledge of the explosive components, make appropriate decisions regarding safety, and prepare themselves and others responding to the accident scene to ensure their safety. The FAA maintains and updates this website regularly with information submitted by aircraft owners, who are required to re-register and confirm information about their aircraft every 3 years by filling out FAA Form 8050-1A.¹⁴ Therefore, the NTSB recommends that the FAA require aircraft owners, during each triennial re-registration with the FAA's aircraft registry, to identify the presence and type of safety devices (such as ejection seats, BRS, or inflatable restraints) that contain explosive components on the aircraft. The NTSB further recommends that the FAA make this information readily available to first responders and accident investigators by displaying it on the FAA's online aircraft registry.

The NTSB notes that aircraft are often modified under supplemental type certificates (STC) with different equipment, which could include safety devices that contain explosive components. The NTSB concludes that if aircraft are modified with STCs for safety devices that contain explosive components in the 3 years since the submission of FAA Form 8050-1A, first responders and investigators may not be aware of the potential explosive components on these aircraft. Therefore, the NTSB recommends that the FAA require aircraft owners who have installed a safety device that contains an explosive component under an STC since the most recent triennial re-registration to submit a new FAA Form 8050-1A, providing updated information regarding the newly installed device.

First responders and emergency personnel, both on-airport and off-airport, need to be aware of and quickly identify aircraft equipped with ejection seats, BRS, or inflatable restraints to determine if the system needs to be disabled and proceed accordingly to maintain their safety. On April 29, 2004, the NTSB issued Safety Recommendations A-04-36 and -37, which asked the FAA to do the following:

Revise training guidelines for 14 *Code of Federal Regulations* Part 139-certificated airports to ensure that airport rescue and firefighting crews receive training in the recognition and disabling of aircraft ballistic parachute systems during emergency operations. (A-04-36)

Distribute a safety bulletin to all 14 *Code of Federal Regulations* Part 139-certificated airports to raise awareness among airport rescue and firefighting crews regarding the hazards associated with ballistic parachute devices during general aviation rescue and firefighting operations. (A-04-37)

In 2004, the FAA issued a CertAlert¹⁵ to transmit guidelines to airport operators and FAA airport certification safety inspectors to raise awareness among ARFF crews regarding the hazards associated with BRS during general aviation rescue and firefighting operations. Further, on

¹⁴ According to 14 CFR 47.15(i), 47.40, and 47.41, failure to re-register will result in cancellation of the registration and registration number assignment.

¹⁵ CertAlerts give the FAA Airports Safety and Operations Division a quick way of providing additional guidance on Part 139 Airport Certification and related issues to FAA inspectors and staff.

April 28, 2006, the FAA issued revised Advisory Circular 150/5210-17A, “Programs for Training of Aircraft Rescue and Firefighting Personnel,” which was revised to state that firefighters should also receive training in recognition of aircraft BRS during emergency operations. The NTSB indicated that the CertAlert (combined with an article written by the National Fire Protection Association) and the training guidelines were responsive to the recommendations and classified Safety Recommendations A-04-36 and -37 “Closed—Acceptable Action” on November 15, 2006, and May 31, 2005, respectively.

While the NTSB is pleased that the FAA took the actions to notify ARFF crews about the hazards associated with BRS, the NTSB notes that 8 years have passed since A-04-36 and -37 were issued, so ARFF crews would benefit from a reminder about these hazards. The NTSB notes that the FAA, in cooperation with the General Aviation Manufacturers Association, various manufacturers, and first responder professional organizations, has developed training for safety at an aircraft accident scene for firefighters, emergency medical services personnel, and police.¹⁶ The training modules contain information about the dangers of explosive components in BRS and inflatable restraints; however, the training modules do not address the explosive components in ejection seats. The NTSB notes that hazards exist with any safety device that contains explosive components installed on aircraft, which ARFF crews may not be aware of, and that many aviation accidents occur off airport property. Thus, the NTSB concludes that notifying first responders and emergency personnel about the existence of the FAA’s online aircraft registry and its contents will help ensure the safety of these individuals. Therefore, the NTSB recommends that the FAA issue and distribute a publicly available safety bulletin to all 14 CFR Part 139-certificated airports and to representative organizations of off-airport first responders, such as the International Association of Fire Chiefs and the National Fire Protection Association, to (1) inform first responders of the risks posed by the potential presence of all safety devices that contain explosive components (including ejection seats) on an aircraft during accident investigation and recovery and (2) offer instructions about how to quickly obtain information from the FAA’s online aircraft registry regarding the presence of these safety devices that contain explosive components on an aircraft.

Therefore, the National Transportation Safety Board makes the following recommendations to the Federal Aviation Administration:

Require aircraft owners, during each triennial re-registration with the Federal Aviation Administration’s aircraft registry, to identify the presence and type of safety devices (such as ejection seats, ballistic recovery systems, or inflatable restraints) that contain explosive components on the aircraft. (A-12-64)

Make the information about the presence and type of safety devices that contain explosive components on aircraft that was collected in response to Safety Recommendation A-12-64 readily available to first responders and accident investigators by displaying it on the Federal Aviation Administration’s online aircraft registry. (A-12-65)

¹⁶ The training modules are available on the FAA’s website at http://www.faa.gov/aircraft/gen_av/first_responders/ (accessed October 11, 2012).

Require aircraft owners who have installed a safety device that contains an explosive component under a supplemental type certificate since the most recent triennial re-registration to submit a new Federal Aviation Administration Form 8050-1A, providing updated information regarding the newly installed device. (A-12-66)

Issue and distribute a publicly available safety bulletin to all 14 *Code of Federal Regulations* Part 139-certificated airports and to representative organizations of off-airport first responders, such as the International Association of Fire Chiefs and the National Fire Protection Association, to (1) inform first responders of the risks posed by the potential presence of all safety devices that contain explosive components (including ejection seats) on an aircraft during accident investigation and recovery and (2) offer instructions about how to quickly obtain information from the Federal Aviation Administration's online aircraft registry regarding the presence of these safety devices that contain explosive components on an aircraft. (A-12-67)

In response to the recommendations in this letter, please refer to Safety Recommendations A-12-64 through -67. We encourage you to submit updates electronically at the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 10 megabytes, please e-mail us at the same address for instructions. To avoid confusion, please do not submit both an electronic copy and a hard copy of the same response.

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations.

[Original Signed]

By: Deborah A.P. Hersman
Chairman