

Raising the Bar

Aviation operations associated with the global mining and resource industry make hundreds of flights a day, often under challenging conditions and in areas with inadequate infrastructure, weak regulatory authorities and inconsistent safety standards.

Flight Safety Foundation's new Basic Aviation Risk Standard (BARS) is intended to address the safety issues facing aviation operations in the resource sector — a term that typically encompasses mining and energy companies with operations that are primarily onshore — by establishing common safety standards.¹ The BARS program also has attracted attention from others outside the resource sector, notably the United Nations World Food Program, which uses many of the same aircraft operators.

"Aviation risk management has always been one of the single greatest challenges to the safety of

personnel in the resource sector," said FSF International Program Director Trevor Jensen, manager of the BARS program. "Combined with the challenging and often remote areas of operations, additional variables increase the difficulty, including the variety of aircraft types, adverse weather and terrain, wide number of aircraft operators and differing levels of regulatory oversight."

Mining and resource companies use aircraft — from single-engine airplanes and helicopters to airliners — in a wide range of activities, including transportation of workers to remote mining operations, geological surveys, helicopter external load flights, photographic missions and medical evacuation flights. Although many operations are small, others are substantial, Jensen said, citing one operator in Western Canada that uses a Boeing 737 to fly 1,000 employees to a remote work site every day.

The new FSF Basic Aviation Risk Standard is designed to help mining and resource companies around the world develop common aviation safety standards.

BY LINDA WERFELMAN

The absence of common safety standards for aviation operators under contract to resource companies has troubled many in the resource sector for years, Flight Safety Foundation said when BARS was introduced in February.

“The variety of safety standards among aviation providers and resource companies has been a concern for the industry,” the Foundation said. “Before the BARS program, there were no clear industry benchmarks for resource companies when assessing the safety of contracted aviation activity.”

As a result, aircraft operators often were subjected to multiple audits that emphasized different sets of standards. Even though the audits often were conducted by the same auditors, the resulting data were not shared.

Accident and incident data for aviation operations associated with the resource sector are incomplete, and it is impossible to determine accident rates for the sector. Compilation of data gathered through the BARS program eventually will make possible that sort of analysis.

Beginnings

Paul Fox, FSF regional director in Melbourne, Victoria, Australia, said the BARS program developed from his conversations early in 2009 with safety officials of BHP Billiton, one of the world’s major producers and suppliers of coal, iron ore, oil and gas, and other resources. The conversations centered on the resource sector’s need for a single consistent set of safety standards, and a corresponding audit procedure.

BHP Billiton and other leading resource companies — Lihir Gold, Minerals and Metals Group (MMG), Rio Tinto and Xstrata — were among the earliest participants in the new program, Fox added. He said that BARS provides the standardization and

consistency of audits that the sector had sought, along with the elimination of unnecessary multiple audits, quality assurance of the audit process, cost efficiency, a centralized accident/incident database and a process to ensure that the industry standards reflect “the evolution of regulations, best practices and identified needs of the sector.”

David Jenkins, BHP Billiton vice president for health and safety, praised the program for its “potential to deliver a step-change improvement in global flight safety standards” in the resource industry aircraft operations.

“Flying remains one of the few activities we all undertake which has the potential for double-digit fatalities from a single event,” he said in an August 2009 letter to industry colleagues. He noted that in 2008 and early 2009, the resource sector experienced major accidents involving helicopters in minerals and petroleum operations, adding that the BARS program represents a “unique opportunity” to prevent such accidents in the future.

The program also has received the endorsement of the Minerals Council of Australia, which passed a resolution in December 2009 encouraging adoption of BARS by aircraft operators that serve that nation’s resource sector.

The program also has stirred interest among relief organizations such as the U.N. World Food Program, and peacekeeping groups, which contract with many of the same aircraft operators that serve the resource sector.

In many countries, especially developing nations in Africa, Asia and South America, the companies that provide these aviation services are “a segment of the industry that’s neglected by the regulators,” said Foundation President William R. Voss. “These operations are not a high priority in many countries.”

Although many operators might receive safety audits through the International Business Aviation Council’s International Standard for Business Aircraft Operations (IS-BAO), the BARS audit “goes a little bit deeper” to address all threats in their operations, Voss said.

He added that the BARS program represents a major change for the resource sector.

“A major weakness of the old company-specific standards was that they tended to be prescriptive and reactive to incidents,” Voss said. “The BARS program, on the other hand, is based on leading aviation industry risk management principles — analyzing possible points of failure and preparing for them.

“Global demand for a standardized risk-management approach has been high in recent years, but it required an independent organization to manage it. Flight Safety Foundation has stepped into that role. Collaborating with industry leaders, we have created a solid standard that anticipates the risks rather than reacts to them, and can be applied to each company’s aviation operations easily and cost-effectively.”

Jensen described the four components of the BARS program: the standard; training the “aviation coordinators” — employees of the resource companies whose jobs include aviation-related responsibilities, even though they may have no experience in aviation; the audit program; and the development of a central database that can be analyzed to identify safety trends.

Flight Safety Foundation’s role has included publishing and updating the standard. Other companies have been selected to develop training for aviation coordinators and for auditors, who must complete BARS auditor training, pass their exams with a grade of at least 90 percent and conduct at least

one audit under an evaluator's supervision before becoming qualified. Jensen describes one of the Foundation's roles as to act as the "auditor of the auditors," overseeing their work.

Safety Culture

The Foundation said that the resource sector and its individual companies have for years had a strong safety culture. One element of that culture has been the frequent use of safety audits. That frequency, however, has itself presented problems, Jensen said.

Because of the absence of a single set of standards applied to the entire sector, individual resource companies adopted their own standards and applied them to the aircraft operators that worked for them.

These multiple standards have resulted in multiple safety audits each year. During each audit, some aviation personnel are diverted from their regular duties to concentrate on the audit, Fox said, noting for some operators, audit time amounts to as many as 28 days a year.

As examples, the Foundation cited the case of one unnamed helicopter operator that experienced 14 separate audits in one year, five of which were conducted by the same audit company. An airplane operator experienced 11

audits, conducted by three separate audit companies, the Foundation said.

"Multiple audits are unnecessary, expensive and time consuming," the Foundation said. "They neither enhance safety levels nor reduce risk."

The resource companies participating in the BARS program have "a strong commitment to and an immediate need for" the program, the Foundation said, noting that the need is "driven by the individual corporate objectives of the companies in respect [to] occupational safety and health, as reflected in their commitment to a 'zero harm' policy for all employees and their requirement to lower exposure to aviation risk."

Program Goals

Goals of the BARS program include creation of a single set of aviation safety standards for the resource sector and a single audit — the BARS Quality Controlled Audit — to ensure that the standards are being met.

Precedents exist for the use of a single industry standard for aviation operations. For example, the International Association of Oil and Gas Producers and the International Airborne Geophysics Safety Association each have their own sets of aviation safety guidelines. The Foundation said that national aviation authorities, in an approach consistent with

recommendations from the International Civil Aviation Organization (ICAO), typically expect industry sectors to exercise "a greater responsibility for the day-to-day administration of their industry and its routine surveillance."

The BAR standards are not intended to override the requirements of regulatory authorities, manufacturers or individual companies, "except to the extent that the standards requirement is higher," the Foundation said. "All the standards are descriptive — versus prescriptive — of *what* is required rather than *how* the end is to be achieved."

If there are differences among ICAO requirements, national regulations, BARS and other specific requirements, the highest standard always applies.

Threats and Controls

The BARS program outlines 15 "common controls" that address all threats discussed in the overall standard, including that only appropriately licensed aircraft operators that have been "reviewed and endorsed for use by a competent aviation specialist" should conduct flights for resource companies.

Another control specifies minimum experience requirements for flight crewmembers, which vary according to the size of the airplane and the crewmember's role as pilot-in-command



(PIC) or copilot. For example, the document says that the PIC of a multi-engine aircraft weighing 5,700 kg (12,566 lb) or more should hold an airline transport pilot license (ATPL) and have at least 3,000 flight hours, including 2,500 hours as PIC and at least 500 hours as PIC in multi-engine aircraft. The copilot should have at least 500 flight hours, including 100 hours of multi-engine time and 50 hours in type, and a commercial pilot license.

Crewmembers in all aircraft being flown for resource companies should have at least 50 flight hours, including 10 hours in type, in the previous 90 days and at least three night takeoffs and landings. All flight crewmembers should receive training every two years in crew resource management and aeronautical decision making, and they should have at least one year of experience in a topographical area similar to that where they will work. They also should have “two years accident-free for human error causes, subject to review by the resource company,” the document says.

Crewmembers also should receive the annual recurrent training specified by the appropriate civil aviation authorities, with at least one flight check every six months for those who work in “long-term contracted operations,” the document says. Training should include

weather-related issues. In addition, before a crewmember begins flight duties in a new location on long-term contract, he or she should receive a documented line check that includes orientation to the local procedures and environment.

The document includes similar requirements for maintenance personnel. For example, a chief engineer (maintenance technician) should have at least five years of experience, and a line engineer, at least two years; both should have an engine/airframe/avionics rating, when appropriate, and both should have no record of involvement in a human-error accident for at least the previous two years.

Recurrent training must be provided by the operator or maintenance service provider at least every three years, and should include discussion of human factors and company maintenance documentation and procedures.

Another of the document’s common controls specifies a basic minimum equipment list — including a terrain awareness and warning system (TAWS) and a traffic alert and collision avoidance system (TCAS) — for all aircraft used in resource company operations.

Other controls require aircraft operators to institute drug and alcohol policies and flight and duty time limits for flight crewmembers (Table 1, p. 18).

According to these controls, a pilot in a single-pilot operation should fly no more than eight hours a day and 40 hours in any period of seven consecutive days, and a pilot in a two-member crew should fly no more than 10 hours a day and 45 hours in seven consecutive days. Duty days for flight crewmembers must be no longer than 14 hours, the controls say, although fatigue management programs may be used instead of these limits if the fatigue management program has been approved by the regulatory authority.

Maintenance personnel also should be subject to duty time limits, in accordance with a fatigue management program designed to “limit the effects of acute and chronic fatigue,” the controls said.

Other controls call on all aircraft operators to conduct an operational risk assessment before beginning operations for “any new or existing aviation activity,” and to implement a safety management system, including a provision to require an aircraft operator to notify the resource company of any “incident, accident or non-standard occurrence related to the services provided to the company that has, or potentially has, disrupted operations or jeopardized safety.”

The last of the two common controls discuss issues involving

Flight Time Limits

Single Pilot	Dual Pilot
8 hours daily flight time	10 hours daily flight time
40 hours in any 7-day consecutive period	45 hours in any 7-day consecutive period
100 hours in any 28-day consecutive period	120 hours in any 28-day consecutive period
1,000 hours in any 365-day consecutive period	1,200 hours in any 365-day consecutive period

Source: Flight Safety Foundation

Table 1

helicopters engaged in external load and offshore operations, and airborne geophysical operations.

Specifics

BARS also examines nine specific types of threats to aviation safety: runway excursions, fuel exhaustion, fuel contamination, controlled flight into terrain, incorrect loading, collision on ground, collision in air, structural or mechanical failure, and weather. In each category, the discussion also includes controls that can be implemented to prevent accidents.

For example, runway excursions can be addressed through six categories of controls, including design considerations in the construction of an airport or helipad to be used in resource company flight operations (Figure 1).

Another control says that company-owned or company-operated airports and helipads should be subject to an operational control and safety review by qualified specialists at least once a year, and landing sites should be assessed before the start of operations.

In addition, the controls call for all multi-engine airplanes to “meet balanced field requirements so that following an engine failure on takeoff, the aircraft will be able to stop on the remaining runway and stop-way, or continue (using the remaining runway and clearway) and climb achieving a

net climb gradient greater than the takeoff path obstacle gradient.”

Crews of multi-engine airplanes without appropriate performance charts should limit their payload to ensure that, in case of an engine failure after the airplane reaches best rate of climb airspeed, “the net takeoff path clears obstacles by 35 ft up to a height of 1,500 ft” above the airport with the landing gear and flaps retracted and the propeller feathered on the inoperative engine.

Flight crewmembers also must have a means of obtaining accurate weather information at company-owned or company-operated airports, the document says.

Accident Defenses

The BARS program also prescribes defenses that can limit deaths and injuries in case of an accident.

For example, the document says, aircraft that are designed and built in accordance with the most recent certification standards have “increased crashworthiness and survivability characteristics.”

A carefully developed emergency-response plan, tested annually, can help, along with installation of an aircraft emergency locator transmitter, use of flight-following systems, a survival kit, first aid kit and crash box. Helicopter

crewmembers in hostile environments also should wear survival vests equipped with a voice-capable global positioning system emergency position-indicating radio beacon. Safety belts with upper-torso restraints should always be worn, and passengers should dress for the environment over which the aircraft is flown. Sideways seating should be avoided for takeoffs and landings unless shoulder restraints are used.

In addition, aircraft on long-term contract that seat more than nine passengers must be equipped with a cockpit voice recorder and flight data recorder, company-owned or company-operated airports and helipads should have a method of extinguishing a fire, and the contracting company should determine the required level of insurance.

Program Phases

The BARS, published in late 2009 and updated in February, is ready for adoption by companies in the resource sector. Auditor training programs — designed for the large pool of auditors who currently are under contract to individual resource companies — are scheduled to begin in July. Actual audits are expected to begin soon afterward, in the third quarter of 2010, Jensen said, and limited data should be available by the end of the year. ➤

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Note

1. Flight Safety Foundation. *Basic Aviation Risk Standard, Resource Sector*. February 2010. Related

sources are the Foundation's *Basic Aviation Risk Standard, Resource Sector Briefing*, Feb. 23, 2010, and the *Executive Committee Recommendation Resource Sector Basic Aviation Risk Standard*, Sept. 1, 2009.

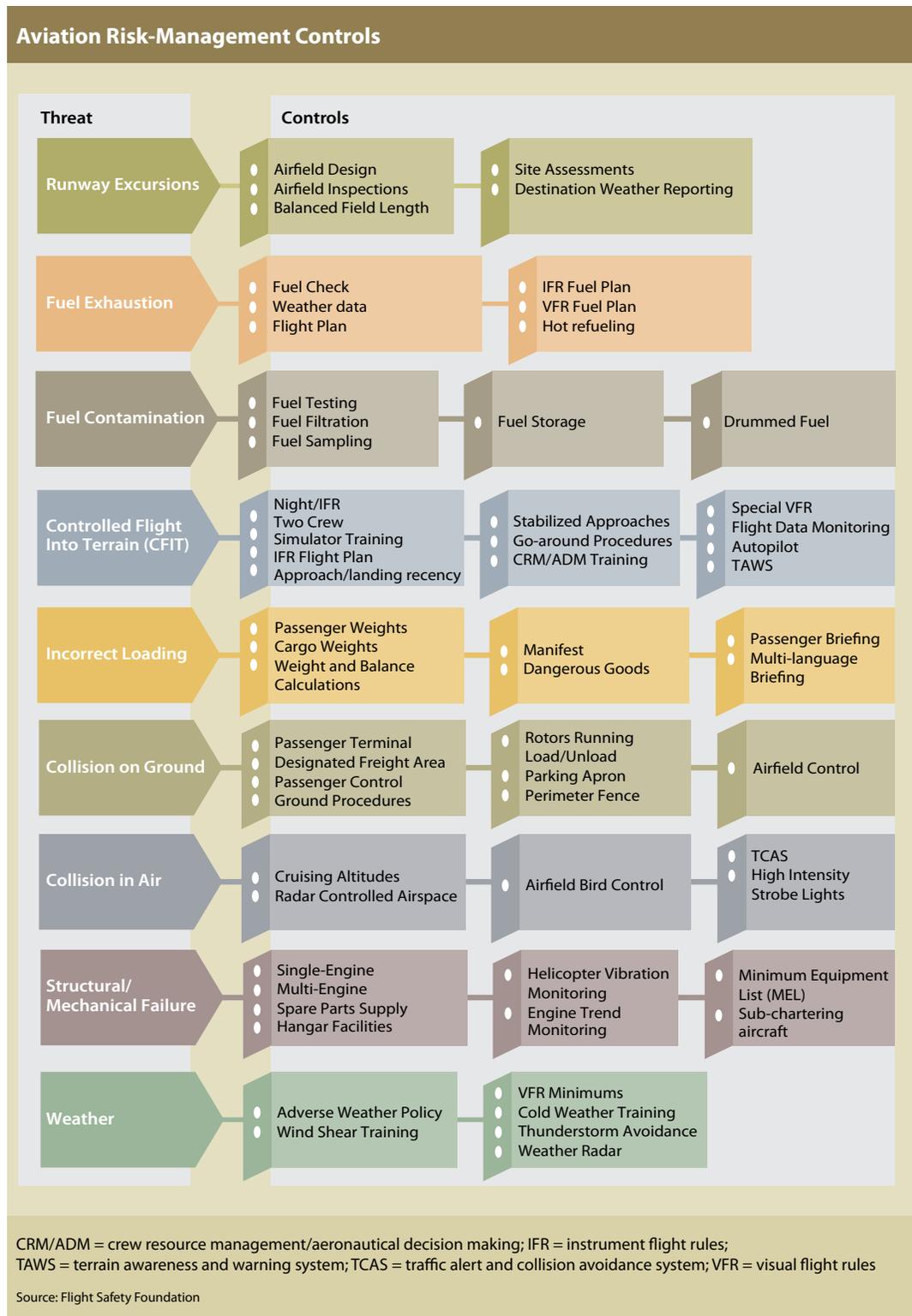


Figure 1