PREMIUM

The insurance industry took its first steps into aviation just a few years after the airplane was invented. Arrangements for insuring early airline operations sometimes were in place even before client airlines existed because of insurers' experience with the risks of other transportation modes. More than 90 years later, however, aspects of aviation insurance that are familiar to an airline's financial risk manager may not be as familiar to its operations risk manager, although both face challenging demands to quantify the economic value of making specific investments in safety.

The main coverages in 21st century aviation insurance policies — excluding those related to war, hijacking and other perils, including terrorism — are for partial, major partial or total hull loss, meaning damage to the aircraft; liability for injury or death of passengers; and third-party liability, meaning liability for bodily injury, death and property damage external to the aircraft. Hull losses typically are paid within weeks, based on an agreed value of the airplane. For airline accidents as a whole, insurers' third-party loss amounts — for example, payment to the owner of a building damaged by an aircraft — have been almost negligible, but with a potential for catastrophic losses in some scenarios.

Exact individual and aggregate passenger liability after an accident, however, is difficult to determine quickly. "Depending on the size of the aircraft, geographical area of operation and the relative legal requirements, [liability] limits can range anywhere from US$250 million to $2 billion," according to Swiss Reinsurance Co. (Swiss Re). "Insurers provide these liability limits to the airline for each aircraft, each takeoff and hence each occurrence, and there is no limit to the number of occurrences covered in a given [one-year] policy period."[1]

Two major airline losses underscore the concern about potential third-party liability. Swiss Re said, regarding the loss of Pan Am Flight 103, in which 259 occupants and 11 people on the ground were killed after a bomb detonated in a Boeing 747 over Lockerbie, Scotland, in December 1988, "third-party losses were caused by terrorism, the theme, which, unfortunately, many believe has grown into the pre-eminent concern in air travel today." The largest recent loss in aviation insurance terms — about $225 million — occurred when American Airlines Flight 187 crashed at Belle Harbor, New York, U.S., on Nov. 12, 2001, following the in-flight separation of the vertical stabilizer on an Airbus A300, according to Michael Mahoney of GE Insurance Solutions.[2]

Recovered from economic shocks of Sept. 11, 2001, aviation insurers by late 2004 operated in an environment in which the hull value of an airliner could be valued at $1 million to $250 million,

INFLUENCE

BY WAYNE ROSENKRANS

Perspectives of aviation insurers widen the scope of resources available to aircraft operations risk managers.



and potential liability for the passenger awards in one fatal accident could be $1.5 billion.

Scenario in 1919

According to 1920 proceedings of the annual U.S. Casualty Actuarial Society (CAS) meeting, England in 1913 became the first country in which an insurance underwriter issued a policy on an airplane; an insurance pool was planned. "Soon after the [World War I] armistice, the leading insurance companies [in England] combined to form a pool to take care of aviation risks," said H.E. Feer, representing the Scandinavian Pool for Aircraft Insurance and its statistical institute. The pool and institute were set up in 1919 by about 90 companies, even before Scandinavian airline service began.[3]

In an early presentation about airplanes to the CAS meeting, Walter Cowles in 1919 said, "The fact that we, here in the United States, are far behind England and all other countries in the development of this most helpful competitive means [the airplane] should not deter us, as representatives of insurance interests, from laying a sound foundation and establishing a useful practice for aircraft insurance, notwithstanding present discouragements, notwithstanding a limited field and notwithstanding the lack of substantial hope for the immediate future. … We must have the aircraft. It must be developed and improved. It must be cheapened in cost and upkeep. It must be dependable. It must be practical."

A. McDougald, commenting on Cowles' paper the following year, urged timely accident investigation and dissemination of related data. "Only by [accident investigation] can weak points in administration, personnel and material be eliminated and the safety of the public proportionately increased. … Aircraft risks as the subject of insurance are new, and it must necessarily be some time before any dependable data can be collected on which to base equitable premium rates. In the meantime, the arbitrary rates will be governed by considerations of analogy and argument, and influenced possibly to some extent by competition."

Fast Forward

A 2006 survey of 51 of the world's top 200 airlines by revenue — conducted by *Airline Business* magazine and Aon — found that an average of 2.1 percent of participating airlines' total revenue was spent on risk management, with about 70.1 percent of that amount representing costs of aviation insurance premiums. Researchers estimated that the top 200 airlines would spend $5.86 billion on aviation insurance premiums.

Aviation insurers may offer insights to operations risk managers on their airlines' overall scope and scale of exposure. While aviation safety professionals typically work to reduce

Historically, aviation insurers have influenced operations risk managers by recognizing best practices that reduce the likelihood of losses.

risk in all aircraft operations that they can influence, aviation insurers see in the world a very broad range of risks, including natural catastrophes such as hurricanes, tornadoes, earthquakes, floods, hail storms, bird and other wildlife strikes; plus man-made exposures, such as those involving war and terrorism.

Aviation insurers know that passengers on a typical airline flight represent several hundred million dollars of liability exposure, with the exact amount dependent on the passenger profile. "Yet when determining the size of a loss after an accident, the types and nationalities of the passengers on board are more important than their actual number," Swiss Re said. "The 'type' of the passenger refers to the status of the traveler [e.g., each person's earning power and dependents, and the country in which court action can be brought]. … [The jurisdiction] factor is central to insurers' exposure calculation, as compensatory damages can vary greatly from jurisdiction to jurisdiction."

Where's My Discount?

A question that arises among operations risk managers is whether a specific safety-related change will reduce an insurance premium the following year, which seems like a good incentive for senior management. One problem, however, is that methods of pricing the premium vary widely. Morton Lane, a U.S. broker-dealer, said in 2003, "There is no agreed-upon theoretical method for pricing [aviation] insurance risk. Several approaches have been designed but none can claim ascendancy over another."[4]

Nick Brown, chief underwriting officer–airline insurance, Global Aerospace, said that the imperative of spreading the risk transferred from an aircraft operator to a large number of disparate insurers and reinsurers adds complexity to understanding premium pricing and the underlying economic factors. "As a consequence of the very large limits of indemnity, all airline insurance policies are syndicated among a panel of co-insurers," Brown said. "It is important to understand that each individual insurer will have its own underwriting criteria and its own methodologies for calculating the premium for a given account."

Technical variables familiar to airline operations risk managers are only part of the equation. "Our pricing models take into account a wide range of risk factors in addition to the basic exposure metrics (fleet values, passenger numbers, departures, etc.)," Brown said. "This includes loadings [adjustments that increase premium] and discounts which are specific to quantifiable technological factors — such as the percentage of the fleet equipped with [a terrain awareness and warning system (TAWS)] and traffic-alert and collision avoidance system [TCAS] — and also more subjective evaluations of the quality of the safety management system [SMS] or safety culture of the airline in question.

"However, the overall premium payable by the airline in question will be an amalgam of the offers of individual insurers, who will all quantify such factors in differing degrees according to their own objective or subjective pricing criteria. Additionally, simple 'market forces' will have a significant influence on the actual premium paid. This makes it difficult or impossible to quantify the economic value — in insurance-premium terms — of making investments in safety, at least on a prospective basis. On a retrospective basis, there is a very clear benefit in insurance terms, because the loss record of an airline will have a significant bearing on how its premium is rated. Over time, therefore, airlines [that] have poor safety management pay much higher premiums due to their claims experience and, conversely, airlines that improve their safety management and consequently improve their claims record will benefit from lower premiums."

Running With Data

Paul Hayes, director of Ascend, said that aviation insurers influence airline management to accept the reality of risks that psychologically may seem incongruous with the safe operations they observe day after day. "Most airlines in the world are small airlines that have never had a catastrophe; in any five-year period, 90 percent have not suffered a loss," Hayes said. "[Accidents] are so far removed from their experience, from operations management — but at some small airlines, if they have an accident the airline is gone."

In many areas of aviation insurance practice, from exposure modeling to insurance premium pricing, external proprietary databases often are used strategically and tactically by brokers, insurers and reinsurers, according to Hayes. "Our data do not allow them to see that airline XYZ does all these good things [for example, TCAS, TAWS, SMS or flight operational quality assurance (FOQA)] but airline ABC doesn't. That has to be part of the information underwriters discover or assume when they're writing the insurance coverage."

Another current application of these databases to aviation insurers' models has been to test hypotheses of why another large aviation insurance loss has yet to occur. "Prior to 9/11, there was an assumption that somewhere in the world, insurers would get a catastrophic loss every year and a half to two years, or something like that," Hayes said. "Six years have gone by, which is an unprecedented period. The American Airlines Airbus A300 in Queens, New York, U.S., in November 2001 was the last catastrophic loss in insurance terms of looking at the dollar cost. One argument put forward is that the recession in the airline industry resulted in so many older-generation aircraft being parked in the desert that we've got a marked change in the fleet makeup … a far higher percentage that are higher technology types, plus TCAS and TAWS are in most of the world's fleet today."

Advising Corporate Operators

Aviation insurers also may influence operations risk management within corporate aircraft operators, helping them to prioritize how they address exposures and keep them in perspective, according to Bob Conyers, vice president and manager of general aviation safety for Global Aerospace. "We offer safety services free to insured operators, for example," Conyers said. "The most popular service is a flight operations survey, which entails a full review of management policies, training standards, operational procedures and maintenance practices. The idea is to assess a flight department's operation compared to similar operators and to pass along 'best practices' — typically well beyond regulatory minimum requirements — that have been observed."

Flight Safety Foundation's Ground Accident Prevention project has found losses less than insurance deductibles difficult to quantify.

Safety-problem recognition by an aviation insurer can generate safety recommendations to its insured aircraft operators. "Following the [fatal Gulfstream III] accident in Aspen, Colorado, U.S. [in March 2001], we have encouraged operators — and generally have been successful — to adopt higher-than-published minimums at mountain destinations," Conyers said. "Strict adherence to higher minimums is generally supported by inclusion in the company's flight operations manual."

Aviation insurers' advocacy of simulator training for turbojet pilots was a classic example of positive influence, according to Ed Williams, CEO of the Metropolitan Aviation Group and chairman of the Flight Safety Foundation Corporate Advisory Committee. "[In] the early 1960s, accident rates of both air carriers and the then–brand new corporate jets were much higher than today," Williams said. "Training accidents, using the aircraft itself, were a particularly deadly endeavor. [But] from the World War II and Korean War eras, there were some chief pilots who believed that they didn't need training because of their high number of total pilot flying hours. The attitude was, 'I'm already a highly experienced pilot with no accidents, and I don't need the training.'"

A combination of training accidents and other accidents during the transition from propeller-driven airplanes to corporate jets took a toll on aviation insurers, who, as a group, decided that something had to be done, he said. "About the same time, FlightSafety International began developing the first flight training simulators for the newly introduced corporate jet aircraft," Williams said. "About that same time, the air carriers had begun to utilize their simulators more and more, and their collective training accident rate — compared with using the actual aircraft — was showing a definite decrease.

So aviation insurers collectively required their insured corporate flight departments either to begin utilizing the available simulator-based training programs or face very high premiums or refusal of coverage. "This influence evolved over 40 years into the situation today in which corporate flight departments are effectively uninsurable if they operate a turbine-powered aircraft but professional, ground-based and flight simulator–based training programs aren't an integral part of their operations," Williams said.

Worldwide Implications

Access to affordable, bona fide aviation insurance coverage remains a critical issue for some aircraft operators in the developing countries with substandard physical and regulatory oversight infrastructure. "It is true that the greatest variation in operating standards is seen in developing parts of the world, and it is in these areas that insurers are most likely to make a positive intervention in order to try and improve the safety of a particular operator," said Brown of Global Aerospace. "Typically, this involves the lead insurer commissioning a third-party expert to conduct a review of the airline's operations and to make recommendations. The lead insurer will then require the airline to address those recommendations and, in the event of non-compliance, may issue notice to cancel coverage."

The opposite concern, however, would be the possibility that this free market can allow substandard aircraft operators to obtain aviation insurance coverage, with a possible implication to passengers that safety standards have been met. "There are certainly airlines to whom Global Aerospace would not offer coverage due to safety concerns," Brown said. "Insurance is a free market, however, and many of these operators will find coverage from other aviation insurers, possibly at very high insurance rates. Others will not be able to buy any coverage in the 'mainstream' aviation insurance market and will either operate without insurance or buy low limits of coverage from local or non-conventional insurers. This will inevitably limit the scope of such airlines [because they] will be unable to meet the insurance requirements necessary to fly into North America or Europe." ●

To read an enhanced version of this story go to the FSF Web site, <www.flightsafety.org/asw/mar07/insurance.html>.

Notes

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