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How Airports Reduce Dangers Of Bird-Strikes

*Sometimes unusual methods are used to reach the goal of aviation safety
but success depends on many factors.*

—
by

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Cal Rodgers, the first person to fly coast-to-coast in the United States, lost his life in 1912 when his airplane collided with a bird. Since this first recorded bird-strike accident, the mixture of aircraft and birds continues as a safety concern throughout the world.

Bird strikes have caused major accidents that resulted in a high number of fatalities. Many more lives were lost in accidents involving fatalities to one, two, or three persons, according to a bird control and reduction publication of the International Civil Aviation Organization (ICAO).

Bird-strikes are costly. They cause delays, unscheduled landings and non-routine inspections. In 1974, European states reported 1,146 bird-strikes that resulted in costs of more than \$4 million (U.S.).

Faster speeds, acceleration of jet aircraft, and larger frontal areas posed new problems. The tremendous suction of turbine engine intakes, which birds cannot sense and anticipate, added further danger.

About 1962, some countries began to form committees to deal with bird problems. ICAO established the Bird-strike Committee Europe in 1966. That committee, now under the chairmanship of H. Dahl, Denmark, recently published its third edition of a bird control and reduction booklet titled "The Green Booklet." It details many of the steps tried in 23 countries. Some worked; some didn't.

Birds are attracted to airports for a variety of reasons — food, water, shelter, safety, and rest. The airport may be on a migration path or it may offer nesting sites. Eliminate as many attractions as possible and bird hazards will diminish.

Food and water are especially strong bird attractions. At some locations, airports increase their own problems by not properly covering garbage from airport restaurants or by dumping restaurant and other refuse on the airport.

Insects, earthworms, and grasses attract birds. Predatory birds are attracted also to airports when small animals, including other birds, are numerous there.

Some birds seek out airports for safety. Gulls, for instance, may roost on runways. There, they feel protected from foxes or other predatory animals which cannot stalk them unseen. The airport is also free of domestic animals, major ground traffic and other disturbances. Many birds quickly acclimatize to the movement of aircraft. Bird invasions for rest may be unpredictable and sudden. Coastal airports often experience this bird danger when there is a storm at sea.

Even waste paper attracts birds. Birds watch others of their kind and when they see others on the ground, land to join them. Waste paper blowing across an airport has been known to attract gulls, presumably because it is mistaken for other gulls. Thus a good safety reason for keeping a tidy airport.

Countries attack these problems in various ways. Austria, as an example, has removed all garbage dumps from the vicinity of airports. The National Board of Aviation in Finland can legislate for better maintenances of garbage dumps. At a dump near Helsinki-Vantaa Airport, for instance, all garbage must be covered with soil. Canada prohibits garbage dumps on any land owned by Transport Canada. Regulations provide for enforcement of Canadian guidelines. One guideline declares "garbage dumps should not be located within an area contained within a circle having its centre at the airport reference point and a radius of five miles."

Norway's State Pollution Control Authority published a set of guidelines for landfills. It states "no garbage dumps should be established closer to an airport than seven kilometers. Existing garbage dumps in the vicinity of airports should, if possible, be closed or removed."

Outsmarting the Gulls

ICAO reports one country's successful efforts to eliminate a garbage dump, an attraction for gulls. Trucks normally dumped household garbage into a dump near the airport and bulldozers immediately tried to cover it with soil. However, they found it virtually impossible to create a thick enough covering. Garbage showing through the surface continued to attract gulls. At the time, estimates placed the local gull population at 15,000.

With the help of an ornithologist, it was discovered that the gulls arrived shortly before dawn and left just after sundown. At night they went to resting areas near the shore. Collection of household refuse continued during the day, but instead of placing it in the dump, it was stacked some distance from the airport in a covered area inaccessible to birds. During the day, bulldozers dug trenches at the dump. After nightfall, the stacked refuse was brought, dumped into the trenches and immediately covered. At dawn when the gulls returned there was no food and only clear soil-covered areas. The gull population dropped from 15,000 to several hundred.

Certain crops such as oats and corn, and weeds such as ragweed, chickweed, or pigweed attract birds. In Belgium, zones of 150 meters (500 feet) from the centerline of each runway and 60 meters (200 feet) over both ends of each runway may not be used for agriculture. France prohibits cultivating land or putting lambs out to grass in the security zone inside the fence of an airport. Outside of security zones, cultivation of anything particularly attractive to birds is prohibited.

The Federal Republic of Germany prohibits agricultural use of land on airports. It also bans waters and swampy areas. Balancing ecological concerns with safety, application of certain growth inhibitors, herbicides and fertilizers are used on grasslands. Organic fertilization, for

instance, is prohibited. Mineral fertilization may be done in small quantities. Hay making and pasturing are prohibited.

In some instances it helps to have the stomachs of birds analyzed to determine what they are eating and take steps to reduce the availability of these food sources.

Birds are also attracted to an airport for shelter. Czechoslovakia proscribes removal of trees and bushes near aircraft movement areas to reduce natural shelters. Canada prohibits trees or bushes within 150 meters of runway centerlines and within the same distance from runway ends. The bird-strike committee of ICAO notes a growing tendency for airports to establish trees as a buffer to shield nearby residents from aircraft noise and exhaust odors, and cautions that these wooded areas can increase the potential for bird-strikes.

ICAO recommends that grass be cut to a height of 23 centimeters (9.2 inches). While many countries, such as Denmark, Finland, and the Federal Republic of Germany, try to maintain this height, others find it difficult to achieve. France, as an example, finds lack of adequate equipment and costs restrict efforts to maintain the specific height. Instead, five or six times a year, grass is mowed to a height of 5-6 cm (2.4 inches).

In some countries bird sanctuaries run counter to aircraft safety.

Airport managers in the United States, for instance, who want to conduct bird reduction programs on an airport or near bird sanctuaries must clear their actions with the U.S. Fish and Wildlife Service and other local and national wildlife preservation organizations.

Australia reports that discussions with parks and wildlife authorities usually result in control of bird sanctuaries near airports. Transport Canada guidelines suggest that no waterfowl refuges, feeding stations and crops, or designated game-mammal refuges be located within 3.2 kilometers (two miles) of an airport boundary. If a sanctuary on land not owned by Transport Canada poses a serious problem to safety, it has authority to remove it under the Aeronautics Act.

Bird Population Control

Although Denmark's Civil Aviation Authority has power to promulgate a regulation to have a sanctuary removed if it creates a serious threat to aviation safety, an example shows what can be accomplished through cooperation with ornithologists and the Department of Nature Conservation.

An estimated 37,000 pairs of herring gulls were breeding on Saltholm Island, just five kilometers (three miles)

from Copenhagen's airport. Every year, nests in the colony have been sprayed with an emulsion of oil in water (MIDOL difencryl oil, 60 percent). The oil closes the pores of the eggs and the embryos die, but the adults continue to incubate eggs. This resulted in fewer young birds. Because young gulls are more likely to hit aircraft than are older ones, the dangers of bird-strikes diminished.

In the first four to five years of the program, the breeding population dropped to about 20,000 pairs. To further reduce the population, authorities used alfa-chloralose. This involves placing a chloralose tablet in a dead heron and putting this in the gull's nest. When the bird eats the bait, it sleeps into death. (A dose of 200 mg is necessary to kill an adult gull.) The combination of spraying and chloralose has reduced the gull population to a far less hazardous 9,000 pairs. This reduction, however, required about 15 years.

Using Distress Calls

Distress calls sometimes scare birds away. Played through a loudspeaker, distress calls — sometimes called agony or warning calls — signal danger to the birds. Canada, France, Federal Republic of Germany, Netherlands, United Kingdom and the United States, have tapes of distress calls and make them available to other countries.

Users report mixed results from distress calls; France reports success. Nice's Cote d'Azur Airport maintains fixed distress call installations along runways. Personnel in the control tower operate them. Bordeaux and Dinard Airports have more simplified equipment. France reports 24 airports use distress calls played from equipment mounted on vehicles. Mobile systems apparently produce better results than do fixed systems.

Belgium reports limited success with patrol cars equipped with tapes and loudspeakers. Czechoslovakia abandoned fixed systems in favor of mobile equipment. So, too, did the Federal Republic of Germany. ICAO explains that distress calls from the same species may produce positive results at one location and not at another, suggesting that even birds have different "languages."

Distress calls often are more effective when combined with pyrotechnics. In Czechoslovakia, for instance, gulls fly together after the sounding of the distress call and meet at the loudspeaker. A shell fired at the flock disperses them.

Shell crackers produce effective results. Gas cannons, however, work in some areas and not in others. Australia found "generally poor results," and Belgium stopped their use. Tested at two airports in France, gas cannons

alone produced unfavorable results. Birds became accustomed to regular explosions. Moving the cannon every two or three days achieved better results. Changing the frequency of detonation, and installing silhouettes (scarecrows) of humans holding guns near the cannons also helped.

Experiments with bird corpses and decoys show limited results. The United States judged them unsuccessful. Finland, Federal Republic of Germany, and France report poor results. Czechoslovakia finds occasional use of crow corpses effective for short periods — about a day. Norway found the corpses attract other animals.

Flashing lights, lasers, violet and ultraviolet lights produce various results. In France, the Service Technique de la Navigation Aerienne tested an experimental device that involved a powerful light with a parabolic reflector. Most of the energy is radiated in the blue color, the violet and ultraviolet. After hundreds of tests, the device was found effective up to 800 meters (2,600 feet) causing birds on the ground to fly away.

Several countries use chemical repellents either to reduce the food supply for birds — earthworms, for example — or to discourage nesting or roosting. This, like other attempts, produced mixed results.

Canada found that treatments of Benomyl, a fungicide, significantly reduced the number of earthworms in soil. A test made in the late 1970s at Windsor International Airport showed the number of worms in each treatment area declined after only one treatment. Eliminating some of the earthworms also reduced the number of sweepings previously required to clear them from runways. Benomyl application at the Helsinki-Vantaa Airport in Finland also decreased the number of earthworms. New Zealand found the insecticide "Thiodan" (commonly called Endosulfan) effective in controlling earthworms and other invertebrates.

A less effective chemical is Reta, according to reports from Israel, Switzerland, and the United Kingdom. Israel reported to the bird-strike committee that some positive results were obtained, but at an investment in spraying far out of proportion to the results.

Commercial Repellent Trials

In the United States, the U.S. Air Force Engineering and Services Center evaluated commercial bird repellents in 1979. According to the bird-strike committee report, "Bird Stop" was judged effective for durability, effectiveness and initial cost. Although adverse weather caused some deterioration, the repellent's properties were maintained satisfactorily. "Roost No More" was effective in deterring pigeons from perching, according to the report. The stringy consistency of the substance

makes it less practical for use indoors. The report showed "Bird Tanglefoot" effective initially, but in the Air Force test it lost its potency with age.

Other chemical repellents keep birds away. In the Federal Republic of Germany, as an example, corn treated with two percent Mesurol proved effective against pigeons, crows, lapwings, starlings, and sparrows.

The method involved placing untreated corn on certain feeding grounds at the same time each day for four days. On the fifth day corn treated with Mesurol was placed in the same area at the same time. The pigeons left and did not return to the airport for seven months.

ICAO warns that any operations with narcotics and poisons should be carried out by specialists. Too little can be ineffective and too much can be dangerous. Because of vast areas covered by airports, chemicals can drain off into streams affecting fish, cattle or even persons. Wells filled by seepage also must be considered when chemicals are used.

Building designs are sometimes a problem. Flat roofs, for instance, often hold water after rain or other precipitation, proving an attraction for birds. Small openings in building decorations or signs provide ideal nesting sites.

An updated report on bird control should be issued soon, according to ICAO's office of public information. Similarly, the bird-strike committee revises its "Green Booklet" at regular intervals. Most previous information about bird control remains applicable today. The value of updated versions, however, is to eliminate listings of chemicals which have proven to be less effective and to share information on new approaches to the problem which have proved successful. Equally important is knowledge of unsuccessful projects. This helps airport managers avoid repeating unproductive methods.

The ICAO bird-strike committee based much of its "Green Booklet" material on information gathered in Europe and North America. However, the committee believes the information is of interest to airport operators in other parts of the world.♦

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A former newspaperman, he now writes for many aviation publications, including frequent contributions to FAA World, published by the U.S. Federal Aviation Administration. He is a coauthor of a college textbook on transportation and the recipient of numerous writing awards

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