# Civil Aviation and the Aircraft Bomb

***Sophisticated incendiary devices have become terrorists' favored means of gaining their sinister objectives.***

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During the last two decades, civil aviation has become a favored target of terrorist organizations. The reasons for this ominous interest are obvious. Internationally oriented, offering ever-growing distances and faster transportation, civil aviation has shown a spectacular growth since the fifties, the number of its passengers having increased by the millions.

Airline companies present themselves, or are introduced, as examples of national prestige and efficiency. Therefore, many countries, whatever their economic situation and whatever the cost, attempt to establish their own national airlines. The aviation companies, whether or not subsidized by their governments, are the pride of their respective countries; their symbolic value as such should not be underestimated. Civil aviation, with more than a million flights a year, has become the most frequently used means of international public transport, long since having left train and ship far behind.

This combination of speed, international range and prestige, enormous distances and nationalist symbolism attracted, some 20 years ago, the attention of violent groups which realized that these aspects might serve their struggle. The isolation of an aircraft in midair, the high visibility of company offices and counters, and the locality of airports were recognized as offering tactically easy targets, of great value to those who in a violent way wanted to draw international attention to their political ideals and demands. Isolation of an aircraft in midair seemed to guarantee a favorable situation for hijacking during which passengers and crew could be easily forced into subserviency and obedience, thus rendering hostage-taking a potentially successful activity.

Hijacking alone could be presented as an act of bravery, to be implemented by way of punishment of or warning to the aviation company involved or the state which it represented. The combination of hijacking and hostage-taking could provide unmistakable pressure for demands concerning release of prisoners, ransom or otherwise, and great publicity if they were conducive to protracted negotiations and the presence of the media.

After the discovery of the vulnerability of aircraft to terrorist attacks, hijackings and hostage-takings spectacularly increased in number. From 1945 till 1968, the year in which the Popular Front for the Liberation of Palestine (PFLP) of Dr. George Habash hijacked an Israeli aircraft for the first time, hijackings numbered less than a hundred, none of them related to terrorist activities or motives. After 1968, however, the number of hijackings increased with more than 600 occurring since then.

Despite attempts to stop this wave of violence through international law and all sorts of security measures, the prevention of hijacking is still flawed. Luggage control, the checking of passengers, the use of metal detectors and the threat of boycotting airports in countries that

follow a sloppy interpretation of these measures, have indeed diminished the danger that armed commandos may enter aircraft undetected. But these security measures have only been implemented at a certain number of airports; at other facilities the danger is still very real due to the lack of organization, money and qualified personnel. This was evident when, in April 1988, an aircraft of Kuwait Airlines, on its way from Bangkok to Kuwait, was hijacked and the passengers and crew taken hostage.

Therefore, the question remains whether the decrease in number of hijackings after 1986 is due to worldwide security efforts, or if it has something to do with the changing priorities and the activities of terrorist groups. These once gained their reputation in the hijack business, but later either faded away or resorted to other terrorist techniques.

There is another reason — there were also setbacks for the criminals. In recent years, a number of hijackings resulted in disaster for the terrorists. Late in 1985, the hijacking of an Egyptian airliner ended in a shoot-out between hijackers and Egyptian commando troops, leaving 50 people dead. The hijacking of a Pan Am flight on Karachi's airport in September 1986 ended in a somewhat similar drama, during which 18 people lost their lives. Another spectacular hijack occurred in April 1988, and it was not a terrorist success either. Although the hijackers threatened to take suicidal action by blowing up the plane with everybody aboard if their demands were not met, they finally settled for a quiet exit; plane, crew and passengers remained unharmed.

Whatever the reason, terrorist enthusiasm for hijacking has diminished during the last three years. On the other hand, however, during this same period civil aviation has been threatened by a far more sinister and lethal terrorist method.

Bombs.

## Air India 1985

In June 1985 an Air India flight crashed into the Atlantic Ocean near Ireland with 329 people on board, minutes after having established normal radio contact with Heathrow Airport, London, U.K., where it was about to land for a fuel stop, before flying to New Delhi and Bombay, India. No one survived the disaster. The wreckage was spread over many square kilometers of open sea, the plane was broken into two pieces and since it had not signalled a Mayday for help, the Indian minister of transport was led to believe that sabotage had caused the crash. *[A bombing was subsequently confirmed. — Ed.]*

The plane had begun its flight in Toronto, Canada, and had picked up other passengers at Montreal before it took off for London. According to the first secretary of the India High Commission, Air India had received bomb threats during the weeks before the catastrophe. The Canadian authorities had therefore been informed, and that was why the police at Montreal airport had seized three suspicious suitcases in the aircraft's cargo, but none of these contained explosives.

The suspicion that a bomb had caused the crash grew when at the Tokyo airport, almost at the very moment the disaster happened, another explosive went off, which was hidden in luggage about to be transferred from a Canadian Pacific plane to an airliner of Air India; the blast killed two people. Several groups had already claimed responsibility; the Federation of Shik students in the United States and the Kashmir Liberation Army.

It was important to know where and by whom the two bombs had been smuggled aboard. In the case of the destroyed aircraft the crime was perpetrated either in Toronto or in Montreal; in the case of the Canadian Pacific airliner there was a choice between Toronto and Vancouver. A passenger told reporters that it had been possible to check in uninspected luggage for the local flight from Toronto to Vancouver, from where it could have been transferred, without further control, to an international flight.

In any case, it was clear that the bomb smug-

glers had used a Canadian airport for their activities, probably Toronto, where the electronic luggage control facilities had been out of order for some time.

"Why fight India in the skies over Ireland — or in a Tokyo airport terminal? There was no explanation. As appalling as their tactics have been, at least the Beirut hijackers showed themselves and voiced specific demands," *Newsweek* commented on July 8, but this comparison between bombers and hijackers was beside the point. Hijacking and hostage-taking are acts of violence with a conditional character; they provide means for establishing negotiations and may end peacefully, either by the terrorists if their demands are sufficiently met, or by their opponents if they are able to take effective countermeasures. An explosive device, on the other hand, is unconditional and therefore, unless threats are made for a second attack, is not useful as a means of coercion. A bombing's irreversible character indicates that those who perpetrate this crime are not in the least interested in contacts with their enemy; their aim is simply to hit, to humiliate and to terrorize — not to negotiate.

Because of the use of explosive devices, new problems for aviation security have arisen. With regard to hijacking and hostage-taking, common sense has demanded the checking of all boarding passengers and their luggage. But common sense now seemed to demand, first of all, the checking of the identity and luggage of passengers who either did not show up or left the plane without their luggage well before its final destination.

## TWA 1986

This logic however, as another event was to indicate, was not always satisfactory. On April 2, 1986, a bomb exploded during a TWA flight from Rome to Athens with 124 people on board; the explosion cut a hole in the fuselage and four people were sucked out of the plane and perished.

Due to the low altitude, about 10,000 feet where the aircraft was barely pressurized, there was only limited damage, and the captain succeeded in landing the aircraft safely. If the device had exploded at 30,000 feet when the aircraft was fully pressurized, which apparently had been the aim of the terrorists, the plane would have totally disintegrated in which case no one would have survived the crash.

Suspicions about the airport where the bomb had been smuggled aboard primarily pointed to Rome, Italy, where the aircraft had begun its flight with 104 passengers who boarded from another flight that had arrived in Rome from New York, and 10 passengers who began their trip in Rome. But there were other possibilities. The plane usually made the flight from Cairo to Athens to Rome and back again, so it departed and landed repeatedly at three airports which in those days had an unsatisfactory reputation in terms of security.

The hole in the fuselage indicated that the device had been hidden in a piece of hand luggage, probably some bag, which had been put in the immediate vicinity of the victims: a Greek grandmother, her daughter and granddaughter and an American of Columbian origin. Responsibility for their deaths was claimed the following day by the Arab Revolutionary cells of Al Kassam but this claim did not earn much credibility. In Italy, the media suggested that Abu Nidal's al-Fatah Revolutionary Council was responsible; Israel's Minister of Foreign Affairs Shimon Peres saw behind the attack a joint venture of Abu Nidal's and Abu Musa's people, and the U.S. government held the 15th of May group of Abu Ibrahim responsible for the attack which, it said, was carried out with Libyan help.

Two days after the bombing, the Italian intelligence service said it was sure that the bomb had been put under seat 10F by a female terrorist, by the name of Monsour or Mansour, who boarded the plane in Cairo and disappeared in Athens. This would have meant that Cairo was to blame for inadequate security, but it also implied that a piece of hand luggage, left without its owner in Athens, was subsequently not discovered by Greek, Italian and TWA security services.

It remained unclear which type of explosive had been used. American experts thought it to have been Deta-sheet, a substance not unlike tar paper which could easily be molded into bag lining. But even without such sophisticated camouflage it was rather difficult to trace explosives at airports because security checks were usually carried out with the help of metal detectors in order to prevent hijacking; metal detectors, however, are unable to trace explosives and detonators.

The search for what really had happened went on, but without satisfactory results. It was generally assumed that on March 25 a Lebanese woman, using the name May Elias Mansour, flew from Beirut to Cairo in a Middle East Airline (MEA) aircraft. On April 2, she went to the TWA desk at Cairo airport to have her return flight changed into a flight from Athens to Beirut, but the desk employee told her that TWA no longer accepted MEA tickets. So she bought a new TWA ticket to Athens, subsequently passed the security check and sat down at seat 10F. She left the plane, leaving a bomb behind, in Athens where she had to wait six hours before she could board an MEA flight back to Beirut.

But the woman, whose name actually was May Elias Mansour, organized a press conference in Tripoli, Lebanon, during which she heatedly denied the charge. She admitted that she was a member of the National Syrian Social Party, that she objected to U.S. policies in the Middle East, but that she had never been involved in terrorist activities.

Italian security personnel, however, persisted in pointing to her odd travel pattern, her sudden decision to go to Athens with TWA which cost her an extra ticket while it had been possible to fly from Cairo directly back to Beirut on her MEA ticket. Moreover, at Athens airport she had thrown away this MEA ticket, although a Greek airport official advised her to try and get back the money she had paid for it.

But there were other aspects that rendered her less suspicious. She had used her real name which is a rather uncommon habit in terrorist circles. She had attracted unnecessary attention trying to change her MEA ticket for a TWA one, and she had waited six hours in the transit hall of Athens airport; in fact, she was still waiting there after the landing of the bombed TWA aircraft, thus breaking almost every rule in the terrorist book. Equally odd was the time of the explosion, namely while the plane was on its way back from Rome after having been put in order and checked there, which meant that she had taken a risk she could have avoided by having the bomb detonate while the plane was on its way to Rome.

## EL AL 1986

The TWA explosion was one of the many terrorist attacks that infuriated the U.S. government and led to its decision to punish Libyan leader Ghadafi, as the likely instigator of these terrorist actions. The American air raid on Tripoli and Benghazi abruptly ended speculations in the media about culprits and motives; the Lebanese woman remained the only suspect.

But one day after the air raid, on April 17, 1986, Israeli security agents at Heathrow airport prevented a bomb from being smuggled aboard an aircraft, thus discovering what could be considered further proof of the terrorist arsenal of inventiveness and possibilities. They stopped a female passenger on her way to an El Al aircraft that was ready to depart for Tel Aviv with 375 people on board. The woman's bag, they found, contained about three pounds of Semtex, an explosive made in Czechoslovakia, and a detonator hidden in a portable calculator. Its mechanism was set for the bomb to explode while the plane would cross the Alps, with horrific consequences.

Soon it became clear that the woman had nothing to do with the explosive contents of her handbag. She was about to travel to Israel where she would marry her fiancé, who at the last moment had decided to take another plane. He had taken her and her luggage to the airport, where he had promised to join her in the Promised Land as soon as possible. The woman's story was accepted, not in the least because

her six months pregnancy did not suggest a suicidal act.

Attention was then focused on the fiancé, who three days later gave himself up to the police. He confessed that his name was Nezar Nawaf Mansur Hindawi, and that as a Palestinian he had Jordanian nationality. In London, he had worked for an Arab newspaper until the Syrian secret service had talked him into perpetrating a terrorist act against some Israeli aircraft, and into sacrificing his fiancé and their unborn child in the process.

Hindawi got a 45-year prison sentence, although he recanted his confession during the trial. His macabre plot was both simple and brilliant. It completely destroyed the assumption that bomb attacks against aircraft were always perpetrated by persons who were not among its passengers. The Hindawi affair made clear that the person who smuggled a bomb aboard could very well be one of its innocent victims.

That discovery was not entirely new. In 1972, some Palestinians had convinced two British tourists, on their way from Rome to Tel Aviv, to carry a record player to Israel on their behalf. The tourists, who had nothing to hide, told about their act of kindness to security personnel after the bomb prematurely exploded.

This risk of early discovery was avoided by the method of Hindawi, whose fiancé could only testify that she was in fact the owner of the bag she carried. And she could also reply affirmatively to the question if she had packed her bag all by herself; she knew nothing about its double layer.

Hindawi's risk of being exposed only became acute in case of failure. While the Palestinian music-lovers could vanish into the crowd, the identity of Hindawi was known by his betrayed fiancee who did not hesitate to cooperate with the police. If however, the attack had succeeded and the plane was destroyed, probably no one would have taken much interest in the background of a pregnant passenger, among so many other dead bodies. The question could be raised whether, perhaps in the case of the TWA flight, a similar use had been made of an innocent passenger who unknowingly carried the bomb aboard in his or her hand luggage.

It was clear by now that defense against those who would bomb aircraft was rather weak, which was an important reason why during the last few years some terrorist groups have dedicated their skills to this particular method. Even the risk of being arrested after a successful bomb attack usually seemed small due to the difficulty of finding evidence in a wrecked and burned-out plane. Unfortunately, these and other favorable aspects have also tempted state authorities to use this means against their enemies, either by supporting such attacks as Syria did in the Hindawi case, or by preparing and executing a bomb attack themselves.

## Korean Air Lines 1987

On November 29, 1987, KAL Flight 858, on its way from Baghdad via Abu Dhabi and Bangkok to Seoul, suddenly crashed into the Adaman Sea near the Burmese coast, with 115 people on board. Bad weather or mechanical failure could not have caused the disaster since minutes before the crash the pilot had announced that the plane was about to land at Bangkok airport without delay or problems.

The likely explanation was sabotage, and this suspicion grew when information revealed that two Japanese passengers, father Sinichi and daughter Mayumi Hachya, had suddenly left the KAL plane in Abu Dhabi and had taken a flight to Bahrain, at least one of them by using a false passport. After being stopped the following day at Bahrain airport for police questioning, both had lighted cigarettes which contained cyanide capsules. The man succeeded in committing suicide, but the woman lived as the result of immediate medical treatment. Papers and names of the two passengers proved to be false, so the initial assumption was that either they belonged to a Korean community in Japan that sympathized with the North Korean regime, or to the notorious Japanese Red Army, a moribund terrorist organization that had suddenly reemerged, threatening to disturb the Olympic Games in Seoul. Their sui-

cide attempt indicated North Korean involvement; it would not be the first time that terrorist attacks, prepared in Pyongyang, ended with the perpetrators committing suicide.

But the plot, as it was revealed by the woman who was afterwards held in custody in Seoul, was even more bizarre. On December 23, she made a full confession and told her South Korean interrogators that her real name was Kim Hyon-hui and that she had been trained for eight years to become a North Korean secret agent. She received this peculiar eduction because of her family's impeccable communist behavior, her attractiveness and her knowledge of the Japanese language.

From April 1980 until April 1981, she was trained in political ideology, fighting techniques, shooting, marching and other para-military skills. After that she spent two years living with a Japanese woman in order to improve her knowledge of the Japanese language and culture and subsequently, until 1984, she followed a course in espionage, military training, driving, photography and communication techniques. In April 1982, she had become a full member of the North Korean Workers Party.

In July 1984, she was ordered to team up with Kim Sung-il, 45 years her senior, and form a "father-daughter" sabotage team. In August and September 1984, Kim Hyon-hui and her "father" received the false Japanese passports that would betray them three years later, and traveled to some West European cities in order to "study the capitalist culture." Afterwards, Hyon-hui travelled alone to Macao and Canton, where she stayed for almost two years learning Chinese. During these eight years of training, her superiors must have been rather content with her performances, honoring her with the Medal for Outstanding Services and the Order of the National Flag third class, in August 1985 and in April 1987, respectively.

On October 7, 1987, she was told that finally the moment had come to put her skills and training into practice. She and "father" Kim Sung-il, were to destroy a South Korean airliner by using explosives, as an act of punishment for Seoul's unwillingness to reunite the Korean peninsula, and for its hosting of the 1988 Olympic Games. This plot, as Kim Hyon-hui revealed, had been concocted by Kim Yong-il, the mentally unstable son of North Korean leader Kim il Sung himself, to whom she swore an oath of loyalty and promised that she would fight relentlessly for the reputation and dignity of her beloved leader.

Then, on November 12, Kim Hyon-hui and Kim Sung-il started their ominous journey flying via Moscow to Budapest, where they arrived the next day. They stayed in the Hungarian capital until November 18 and behaved like normal tourists. From there, they were driven by car to Vienna, where they picked up their false Japanese passports and bought tickets for a November 28 Belgrade-Bagdhad-Abu Dhabi-Bahrain flight, and for an Abu Dhabi-Rome flight on November 29.

On November 23, they went to Belgrade where, as in Vienna, they were the guests of the North Korean Embassy. On November 27, a day before the sabotage action started, they were given the bomb, which was partly hidden in a portable radio cassette and partly in a bottle filled with a fluid explosive substance.

On November 28, they boarded the Iraqi plane which was to fly them to Baghdad. Before taking off, however, they had to hand over the radio batteries for security reasons, so they travelled without music and without the possibility to activate the bomb. Only after the landing in Baghdad were the batteries returned to them. While they were waiting in the transit hall, they were asked again to hand over the batteries, but after complaining to the security authorities about this nuisance, they managed to keep them and to set the timer, which was to activate the bomb nine hours after takeoff.

KAL Flight 858 flew them to Abu Dhabi where, after leaving the plane, a second problem emerged. They were not allowed to leave the airport because they had no entrance visa, so they were forced to fly to Bahrain where they had to change their Abu Dhabi-Rome tickets to Bahrain-Rome ones, which also meant that they had to wait two days before they could

fly back to Rome. On December 1, they were finally stopped as suspects at Bahrain airport, and cyanide seemed to offer the only way out.

It was not altogether clear why Kim Hyon-hui had decided to confess. She said she had done so because she had been very favorably impressed by South Korean life, of which she had been given such a very negative picture by her homeland. But it was also possible that she pleaded guilty out of fear to be sent back to Pyongyang, where her superiors might have liked to rectify her failed suicide attempt.

But this failure was only one of the many mistakes she and her partner had made. In spite of her extensive Japanese education, none of her interrogators had been fooled by it. Her and her partner's false passports had been used by them many times before, and therefore should never have been used to serve as identity papers during such a dangerous mission.

They took another risk while boarding the Iraqi aircraft in Belgrade. The war with Iran and the hijack attempt in December 1986 had alerted Baghdad in terms of aviation security, and it had been sheer luck that no one discovered the explosive contents of their luggage; even later, while they were waiting in the transit hall, the Iraqi authorities had almost frustrated their sabotage mission by asking again for the batteries. Even their escape route proved to be a mistake. No one seemed to have informed them about the need for an entrance visa in Abu Dhabi, and this lack of information cost them two days, enough time for their pursuers to track them down.

The false Japanese passports would have been useful if their escape had been successful, in which case investigations would probably have stopped at the notion that two unidentified passengers with false passports had left the plane in Abu Dhabi. But their arrest, and the subsequent checking of their passports, code books and address books, along with photographs and other material they carried, made it rather easy to connect them to the North Korean regime.

The clumsiness with which their sabotage mission had been prepared and executed made it possible to identify the real culprits, but in spite of this clumsiness no one had been able to prevent what had happened. Their lack of subversive craftmanship emphasized once more the danger of aircraft bombs. When terrorist dilettantism did not stop sabotage plotters from destroying an aircraft, then much more was to be feared from professionals using the same means.

## Lockerbie 1988

The threat of a professional bomb attack materialized one year later. On December 21, 1988, a Pan Am Boeing 747 jumbo jet suddenly crashed onto the small Scottish town of Lockerbie, killing all 259 people on board and an additional 11 on the ground; the disaster left the town a shambles. Suspicions about sabotage grew when the next day a shadowy pro-Iranian group, the Guardians of the Islamic Revolution, claimed responsibility and declared that the disaster was an act of revenge for the downing of an Iranian airliner by the U.S. navy five months earlier; this claim, however, was given little credibility.

The same day, it became publicly known that on December 5 the U.S. Embassy in Helsinki had received a tip about a possible bombing by the Abu Nidal group of a Pan Am airliner on its way from Frankfurt Airport to the United States. Although the Finnish police had dismissed the tip as a hoax, the U.S. government acted upon it and advised its embassy personnel to avoid Pan Am flights for the time being. When this advice became public, it created a row, as the bereaved families of the victims accused the U.S. government of keeping this kind of information all for itself, while not warning the public at large.

But there had been even more ominous signs that something terrible was about to happen. On October 27, West German police raided 16 houses in several cities, arrested 14 Palestinians and uncovered large caches of arms, ammunition and explosives which, according to the police, were to be used in actions abroad.

All 14 Palestinians were members of the Popular Front for the Liberation of Palestine-General Command (PFLP-GC), the pro-Syrian and, since 1983, anti-Palestine Liberation Organization (PLO) of Achmed Jibril.

Jibril was a former Syrian army captain and a proven expert in bomb attacks against civil aviation.

The German authorities did not explain why they arrested the group at this particular moment; some members had been staying in West Germany for two years by then. They also did not explain why, just a few days later, they released 12 members of the group, and why, for the next two weeks, they kept silent on the discovery of two specific bombs which they found hidden in radio cassettes and equipped with altimeters, a clear sign that they were intended to be used against aircraft in midair. The official comment that the authorities had no clue as to what purpose the arms might serve seemed strangely inaccurate where these two bombs were concerned.

A few weeks later, a more general warning, given by Yasir Arafat's Palestine Liberation Organization (PLO), stated that either Israeli agents or Palestinian extremists were planning terrorist attacks designed to undermine the new dialogue between the U.S. government and the Palestine Liberation Organization.

Warnings and arrests were unequivocal forebodings of disaster, but they did not incite airport authorities to increase the amount and the quality of precautionary security measures. According to passengers on Pan Am flights, security had continued to be rather lax and luggage even had been loaded and transported without its owner.

In the week of Christmas 1988, experts made major efforts to establish the cause of the calamity, scrutinizing the wreckage which was spread over hundreds of square kilometers. Meanwhile, speculations ran high in the media, offering Pan Am and Boeing company officials some hope that it had been a bomb, in which case they could not be blamed for structural failure, while airport officials favored the cause to be structural failure, in which case they could not be blamed for security faults. Then, on December 28, the experts announced they had found conclusive evidence that a sophisticated plastic bomb, hidden in the plane's forward luggage, had destroyed the aircraft. It is highly probable that the terrorists who planted it, were rather upset by this discovery. They had intended all evidence to disappear, but because the plane had been delayed for 25 minutes it had not crashed into the Atlantic Ocean as planned, but above ground from an altitude of 31,000 feet.

The evidence ended the speculative phase of the investigation and turned it into a criminal one. It became paramount to establish where, how and by whom the bomb had been planted. The plane had been on the London-to-Frankfurt leg of Pan Am Flight 103, which originated with a smaller Boeing 727 jet in Frankfurt. Baggage and passengers from that aircraft were transferred to the jumbo jet at Heathrow airport in London.

Therefore, there were two airports where the bomb could have been smuggled aboard, and a discussion started between Frankfurt and London over which was to blame for the security failure. West German authorities were initially confident that no evidence could be established to conclude that the bomb had been loaded in Frankfurt, but this confidence may have been based on the fact that some of the 727 plane's luggage had passed through a pressure chamber. The British explosive experts, however, believed that the bomb, hidden in a transistor radio, had been set off by a sophisticated double detonator device, consisting of a barometer trigger and a timer, which had protected it against early detonation.

Strong evidence pinpointed Frankfurt airport as the more likely place were the bomb has been planted. One of the Toshiba radio cassette bombs the German police had found in October had been equipped with the same double detonator system. Further, it became known that one month later another member of the PFLP-GC had also been arrested in Germany, while carrying another radio cassette bomb which had been manufactured in exactly the

same way. Nevertheless, German authorities kept insisting that trying to link these bombs with the one that downed Flight 103 was a matter of pure speculation.

Another effort to soften the forebodings of the disaster was made by U.S. officials who kept concurring with the Finnish police that the warning of December 5 was a hoax. It had been, however, a rather accurate hoax, predicting a few weeks before the crash that the target to be attacked was a Pan Am flight from Frankfurt to New York, a hoax also prompting the U.S. government to advise its diplomatic staff to avoid Pan Am flights.

According to British investigators, the bomb had consisted of about 300 grams of Semtex (and not 13.5 kilos as an American expert stated), hidden inside a radio cassette player and probably molded and painted like the cassette's backplate. Semtex, produced in Czechoslovakia, is highly explosive, very stable and odorless, and can be molded into almost any shape. These qualities make it practically undetectable at normal security checks.

In the past, the PFLP-GC of Achmed Jibril had earned quite a reputation for using barometric devices against aircraft, and this was the same group of which 14 members were arrested, among them second-in-command Hafez Kassem Dalkomoni, while three were in possession of explosive devices similar to the one that was used. Nevertheless, perhaps because of the German denial that a necessary link existed between those arrested and the fatal bomb, other terrorist organizations were also initially suspected, like Abu Ibrahim's May 15 group and Abu Nidal's al-Fatah Revolutionary Council.

U.S. officials added to the confusion, admitting that Jibril's men had been responsible for placing bombs on a railroad track in West Germany, during April and May, in attempts to derail two trains carrying U.S. troops, but denying there was any direct evidence to connect this group with the Pan Am bombing. Other allegations pointed to a collaboration of the PFLP-GC with Shiite extremists and Iranian terrorist groups, all contributing to the British conclusion in March 1989 that it was still impossible to accuse any individual or group as directly responsible for the disaster.

The question of how the bomb had been smuggled aboard proved to be another riddle. There were speculations about a suicide bomber, about innocent passengers who like Hindawi's fiancé had been tricked into carrying the bomb aboard and about airport employees being bribed to do so, but firm evidence was difficult to obtain.

What was obtained, however, by the public at large, was a bad impression of the level of communication and cooperation between the parties involved, and of the implementation of safety measures. A report emerged, produced in 1986 by an Israeli security firm, which stated that Pan Am was highly vulnerable to most forms of terrorist attack. It also considered the security system used by most Western airports as to be inadequate, being particularly critical of the screening of luggage.

The U.S. Federal Aviation Administration (FAA) came under heavy attack by the U.S. House of Representatives Government Activities and Transportation sub-committee, which stated that before the Lockerbie disaster the FAA had issued seven warnings that something was to happen, but they were connected in very vague and inaccurate terms.

While Frankfurt and London airport officials were still arguing about which airport was to blame, British police began complaining about the lack of cooperation shown by their West German colleagues, thereby starting a bureaucratic conflict. A political conflict developed when the British Labor opposition accused the minister of transport of administrative sloppiness and lying about his handling of the warnings that had been made by the FAA. All these conflicts contributed little to the reassurance of the average citizen who kept wondering about aviation security.

The puzzle of the Lockerbie case gradually became more complex. In April 1989, British investigators believed they uncovered an international network of organized crime, feed-

ing millions of dollars from bank robberies in Denmark to terrorist groups like the PFLP-GC. In May, the Swedish police arrested five members of the PFLP-GC, and assumed that among the arrested were the leader and some perpetrators of the Pan Am bombing. In the same month, a West German magazine revealed that one of the PFLP-GC members arrested in October 1988, Marwan Khreesat, was in fact a West German intelligence agent; this could explain his early release and the reluctance of the German authorities afterwards to participate wholeheartedly in the Lockerbie investigations. Other sources, however, maintained that Khreesat was a double agent who, after his release, continued to perform his terrorist task, finishing the device that was to destroy Flight 103.

In October 1989, the Lockerbie investigation team finally got a new lead, which brought them to Malta, where one year before a man bought clothes, the remnants of which had been found in the case where the bomb had been hidden. This evidence, according to the team, was withheld by the West German police for six months, which was one reason why cooperation between the two forces had practically ceased to exist. Another piece of information the West Germans knew about for half a year, showed that on the morning of the bombing, the case with the clothes and the bomb was sent by air from Malta to Frankfurt, where it was checked through and loaded on Flight 103 to London without a passenger accompanying it. Additionally, the Lockerbie team discovered that in October 1988 two senior members of the PFLP-GC, Hafez Kassem Dalkomoni and Abu Talb, had visited Malta and had made contact there with one of the organization's European cells on the island. So, suspicions focused again on Jibril's PFLP-GC and its links with Syria, Iran and Libya.

One version of what might have happened suggests that the bomb was fabricated by one of Jibril's explosive experts, and later was taken by Abu Talb to Malta, where, together with clothes in order to keep it from moving about, it was put in a suitcase, which was taken aboard by an innocent passenger as a favor to its original owner and flown to Frankfurt where, notwithstanding safety rules, it was loaded on Flight 103 without being accompanied by a passenger. According to this version, the plot was the outcome of a cooperative terrorist effort of Jibril's PFLP-GC and Shiite zealots around ex-minister Ali Akhbar Mohtashemi of Iran, himself a fanatic, and it was meant as an act of revenge for the downing of the Iranian civil aircraft in July 1988.

Another version, put forward by investigators of Pan Am, tells a totally different story. It accuses CIA agents based in West Germany of having protected, since January 1988, a drug line to the United States in exchange for the drug trafficker's help in liberating American hostages in Lebanon. The drug trafficker, however, harboring close links to Jibril's organization, permitted the PFLP-GC to use his protected drug line for carrying a bomb aboard the plane, under the watchful eyes of the CIA.

The story seems hardly credible, but unfortunately the identity of the drug trafficker makes it difficult to dismiss it completely as a bad joke. Monzer Al Kassar, as was revealed by a recently published book on his career, is one of the most wealthy criminals in the world, with excellent connections to some Middle East and West European politicians. He made his fortune as an arms dealer and a drug trafficker, and dedicated part of his immense wealth and energy to the terrorist fight against Israel.

Monzer Al Kassar is a personal friend of Abu Abas, the leader of the Palestine Liberation Front who was the brains behind the hijacking of the ship *Achille Lauro* in 1985. He has a working relationship with Abu Nidal, the most notorious terrorist leader of the Middle East, and has repeatedly sponsored Achmed Jibril's PFLP-GC, the group most likely to be held responsible for the destruction of Flight 103. As a Syrian, he nonetheless travels on a South Yemen diplomatic passport, which, together with his influential political friend in the Middle East and Europe, makes him practically invulnerable. A man like Monzer Al Kassar could be just the right person for a plot as described by the Pan Am investigators, although it will be difficult, if not impossible, to find any hard evidence against him.

For the moment, the Lockerbie investigation seems stalemated and because of bureaucratic infights, battles of prestige and official secrecy of many parties involved, it is uncertain whether the case will ever be solved*. The tragedy of the 270 dead and the grief of their families and friends have not prevented the aftermath of the crash to become an unfortunate example of how an investigation into such a calamity should not be conducted. Airports and aviation companies are likely to lose credibility when their behavior betrays concern for their own reputation, and little respect for the feelings of the bereaved and the public at large. The same goes for the secret services involved, which seemed to be more anxious to protect their own sources of information rather than to share them in a combined attempt to bring the inquiries to a satisfactory end. *[* A bombing was subsequently confirmed. — Ed.]*

## Subsequent Events and Concern

During the last few years the number of hijackings has sharply declined; this is the good part of the story. The bad part is that during the same time the use of aircraft bombs has grown. Apart from the cases described here in some detail, there were other crashes, either probably or certainly caused by explosives. For instance, some South African aircraft crashed during the last two years, and although heavy restrictions on reporting make it impossible to ascertain the cause, the use of explosives was not ruled out.

In August 1988, president Mohammed Zia ul-Haq of Pakistan and 30 other persons lost their lives in a crash, probably caused by a gas bomb. In September 1989, a DC-10 aircraft of the Union des Transports Aériens (UTA) with 170 people on board was downed while it flew over the desert; French investigators concluded from the debris which was spread over a hundred square kilometers that an explosive device, probably Semtex, was to blame for the calamity. And in November 1989, the aircraft bomb even became a tool for criminals, when the Medellín drug cartel put a bomb in a Columbian passenger jet and downed it, killing all 107 people on board.

The lessons to be learned from all these cases are manifold. One is that in terms of casualties the use of the aircraft bomb is a far more lethal method of attack than hijacking or other known forms of terrorist attack. From 1985 onwards, more than 1,000 people lost their lives in bomb attacks on aircraft, thus making this explosive device the deadliest terrorist threat to aviation so far. This fact has to be taken into serious consideration by all aviation authorities, for in the long run it may have a devastating effect on the public's trust in aviation security. Going through a hijacking has never been a pleasant experience, but one had at least a fair chance to come out alive; an aircraft bomb usually does not offer this prospect.

The main reason for hijacking, moreover, has been to obtain a means of coercion, in order to negotiate; the paramount reasons for bombing an aircraft have mostly been revenge, punishment or sheer murderousness, only placated by a massacre. A successful bomb attack may even become negotiable if the bombers threaten that it may not have been their last one. So, from the terrorist point of view, the bomb is multifuctional while the hijacking is not, and therefore the former is more likely to be used in the future.

Another incentive for using bombs lies in the lower risk of being caught. Although the necessary presence of hijackers increases such risk, the bomber may very well be far away when his plot is carried out. Besides, a bomb is so much easier to smuggle aboard, especially when the explosive material is of high quality and only requires a small quantity.

An additional reason why terrorists prefer bombs nowadays, may have to do with the form and content of aviation security, which has developed into a rather effective deterrent against hijacking, but which is still practically defenseless against bombing. For years, hijackers have shunned Western airports, knowing that security precautions make it very difficult to smuggle their hardware aboard. But bombers seem

hardly deterred in this respect; the Air India, TWA, Hindawi and Lockerbie occurrences were all connected with Western airports.

One factor which makes it so difficult to prevent bombs from being taken aboard aircraft is the number of people that must be checked. Every boarding passenger falls in this category, and apart from them specifically are the passengers who check their luggage but miss their flight. After the Hindawi affair, El Al security agents kept a watchful eye on women who travel alone, as a suspicious type of person most liable to be enlisted into carrying explosives.

One way to prevent such disastrous surprise luggage, is to find an effective way to ensure that all passengers guarantee the luggage they carry to be entirely their own. Such confirmation, in order to become effective, must be obligatory, and not voluntary. For example, at Schiphol Airport signs have been put up which only advise passengers against carrying another person's luggage; the signs, moreover, have been put up in such a way that it is very difficult to see them. Some sort of a simple, but effective administrative system should be worked out that would make it almost impossible for innocent passengers to be duped into such a dangerous act of kindness.

Bombers like the North Korean terrorist couple, however, who bring a bomb aboard themselves and then leave the plane before it reaches its destination, would not be discovered by such measures. They might be stopped from executing their sabotage plans by ruling that every passenger who carries electrical equipment has to separate the energy source, like batteries, from the object it feeds. Radios and pocket calculators have been used as bombs and detonators, so there is every reason to focus security attention on these and similar devices. An additional measure might rule that these objects are only carried as hand luggage, to make effective control easier. These two measures combined, if applied rigorously, might even frustrate terrorists attempts à la Hindawi. Another, more severe measure would be to ban these devices altogether.

Passport control may also be improved, in order to spot false identity papers more effectively. The trouble is, however, that state-sponsored terrorists or people like Monzer Al Kassar may very well travel on authentic passports. But whatever security measures are taken, they will never be foolproof. Some airports are better organized than others, and are more capable of introducing and applying new measures. This creates the danger, as it did during the hijacking period, that bombers will look for less organized airports to carry out their plots. Introduction of high tech equipment, like Thermal Neutron Analysis, which up to a certain point is able to detect explosives, can be of help but may cause the same effect. The cost of a TNA apparatus, some $900,000, will render it prohibitive for airports which simply cannot afford such investments.

Finally, in order to get an accurate picture of the threat, it may be worthwhile to analyze all former aircraft bombings in great detail, and this time with the help of classified documents.

As already suggested, the use of airplane bombs makes it far more difficult to predict which country or which aviation company may be at risk. In the case of hijacking, it has always been possible, up to a certain point, to predict which would be likely targets, such as states that had terrorists in prison. But revenge, punishment and sheer hate as motives ridicule any prophesying effort.

The only clue may be the kind of activities some terrorist organizations and their sponsoring states have developed. As in the past, when some organization specialized in hijackings, other ones now have a bombing reputation like Abu Ibrahim's May 15 group and Achmed Jabril's PFLP-GC, so it is useful to keep an eye on them specifically. But unfortunately, this does not rule out the danger coming from newcomers, like Shiite extremists or loners like Hindawi. Some states have been exposed as sponsors or perpetrators of aviation bombings like Syria, Iran and North Korea, but then again, these states are not the only ones with such potential. Notwithstanding these uncertainties, combined international effort and intelligence are required to bring some

order and effectiveness in the fight against aircraft bombing.

Warnings at random, like that which the U.S. government gave late in 1989 in an attempt to preclude the same criticism as was launched after Lockerbie, are paramount to crying "wolf" once too often. Yet, the terrorist bomb threat against civil aviation is far too lethal to ignore or underestimate.♦

## *About the Author*

*C.J. Visser studied modern history at the University of Amsterdam during the 1960s. He was a researcher at the Netherlands Institute of Questions on Peace and Security, The Hague, from 1970 to 1983. Since then he has been a member of the research department of the Netherlands Institute of International Relations Clingendael, The Hague, where he has written books and articles about terrorism.*

*A recognized authority on the subject of terrorism, Visser has studied the Basque separatist group ETA and the Italian Red Brigade, as well as terrorist groups in Latin America and the Middle East. He has spoken and written for the Flight Safety Foundation and is the author of the FSF pamphlet "Civil Aviation Remains Vulnerable to Terrorism."*

## Aviation Statistics

# Civil Aviation and Safety in United Kingdom A Decade of Progress 1980-1989

*Shung C. Huang*
*Statistical Consultant*

The United Kingdom has one of the highest levels of civil aviation activity in the world, particularly in international airline services. In 1980, U.K. airlines flew 34.72 billion passenger miles (56 billion passenger kilometers) in total operations and 33.5 billion passenger miles (54 billion passenger kilometers) in international operations. By 1989, the passenger miles in total operations increased to 54.8 billion (88.4 billion passenger kilometers) and in international operation increased to 52.1 billion (84 billion passenger kilometers). Among the International Civil Aviation Organization (ICAO) member states, the volume of U.K. airline worldwide service is ranked number four. In international passenger service they are ranked second in the world next to the United States.

The functions of promoting civil aviation activities in the United Kingdom are jointly performed by the Civil Aviation Authority (CAA) and the Department of Transportation. The CAA is both a public service enterprise and a regulatory body. Its responsibilities include:

- the national air traffic services, both air traffic and telecommunications, in conjunction with the Ministry of Defense.
- the economic regulation of the civil aviation industry, including air transport licensing and approval of air fares, and the licensing of air travel organizers.
- air safety, both airworthiness and operational safety, including licensing of flight crews, aircraft engineers and aerodromes, and certification of U.K. airlines and aircraft.
- consumer interest, private aviation requirements, economic and scientific research and collection and publication of aviation data.

Aside from the CAA, the Department of Transportation is responsible for government civil aviation policy, international civil aviation relations and coordination of aviation security. The Air Accidents Investigation Branch (AAIB) of the department is responsible for investigation of aircraft accidents that occur in the United Kingdom. The AAIB publishes bulletins on reportable accidents.

In the past decade, U.K. civil aviation activities showed a continuing increase with some minor leveling off in some years. Although there were few changes in the number of airports open to public use, aircraft on the U.K. Register increased 76 percent, the pilot population increased 42 percent, airline service in

creased 59 percent and general aviation aircraft hours flown increased 22 percent.

Table 1 shows that in Great Britain there are 140 airports open to public use and another 121 for private use only. In U.K. territories, there are about 15 airfields open to public use.

**Table 1 — United Kingdom Airports 1980 - 1989**

| | Open to Public Use | | | Private Use Only | |
|---|---|---|---|---|---|
| Year | Land | Water | Heliport | Total | |
| 1980 | 131 | 1 | 8 | 140 | 121 |
| 1982 | 131 | 1 | 8 | 140 | 121 |
| 1983 | 129 | 1 | 7 | 137 | 121 |
| 1984 | 129 | 1 | 7 | 137 | 121 |
| 1985 | | Not Reported | | | |
| 1986 | | Not Reported | | | |
| 1987 | 126 | 2 | 10 | 138 | 121 |
| 1988 | 145 | 2 | 6 | 137 | 121 |
| 1989 | 137 | 2 | 3 | 142 | 121 |

Source: ICAO Annual Report and monthly bulletin.

Table 2 shows the number of aircraft on the U.K. Register. In 1980, there were 5,600 registered aircraft. Of these, about 10 percent were helicopters and 90 percent were fixed-wing aircraft. The number of aircraft increased to 7,137 in 1985 and almost 10,000 in 1989. The number of aircraft on the U.K. register would well exceed 10,000 if gliders and balloons were included in the total count of aircraft registered. It is estimated that about 10 percent of the total aircraft, almost all of which were jet transport and other large aircraft, were used by British airlines for domestic and international airline operations.

**Table 2 — Civil Aircraft on Register 1/ United Kingdom 1980 - 1989**

| Year | Fixed-Wing | Rotorcraft | Total |
|---|---|---|---|
| 1980 | 5,901 | 549 | 5,640 |
| 1981 | 6,132 | 600 | 6,632 |
| 1982 | Not Reported | | |
| 1983 | Not Reported | | |
| 1984 | Not Reported | | |
| 1985 | 6,544 | 593 | 7,137 |
| 1986 | 7,151 | 617 | 7,768 |
| 1987 | 6,462 2/ | 635 | 7,097 |
| 1988 | 9,017 2/ | 745 | 9,762 |
| 1989 | 9,250 | 720 | 9,972 |

Source: Aircraft on Register — ICAO Annual Publication.
1/ An average of 8 percent of the total registered aircraft was used for airline operations.
2/ The reasons for the large decrease and increase over the years were not available.

Table 3 shows the changes in the U.K. pilot population by pilot certificate. In the beginning of the last decade, the United Kingdom had 33,289 licensed civil aviation pilots. Of the total, 67 percent were private pilots, 10 percent commercial pilots, 22 percent airline-rated pilots and about 1 percent were glider pilots and balloonists. In 1988, the licensed pilots increased to 47,312, or up 42 percent. The number of airline-rated pilots increased 53 percent and account for 24 percent of U.K.'s total pilot population. One source reported that as of mid-year 1990, there were 13,096 aircraft on the U.K. register. If this figure is used for comparison, the pilot and aircraft ratio is estimated to be approximately 3:1 which is about the same as in Canada and the United States. The worldwide average pilot-to-aircraft ratio is estimated to be close to 2.5:1. During the past decade, U.K. civil aviation activities, both in airline and general aviation, increased about four to five percent annually in terms of aircraft hours flown.

The safety performance of U.K. civil aviation is very comparable with other nations in the world. Although the total reportable accidents and fatal accidents of U.K. airlines and general aviation operations fluctuated annually, the accident rates for U.K. civil aviation over the year showed a trend of slight improvement.

Table 4 shows the U.K. airline accidents and rates for the period 1980 to 1987. In the eight-year period, U.K. airlines were involved in two fatal accidents in 1980 and one fatal accident each in 1981, 1985 and 1986. All other years were free of fatal accidents. Although the accident statistics for the latest two years are not available for the comparison, the trend for the eight-year period as shown in Table 4 appears to be continuing downward.

## Table 3 — United Kingdom Civil Aviation Pilots Calendar Year 1980-1989

| Year | Private Pilot | | Commercial | | Sr. Commercial | Airline | Balloon | Glider | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Fixed | Rotor | Fixed | Rotor | Pilots | Rated | | | |
| 1980 | 22,196 | 193 | 2,727 | 175 | 285 | 7,458 | 255 | n/a | 33,289 |
| 1981 | n/a | | 2,818 | 167 | 239 | 7,656 | 255 | n/a | — |
| 1982 | n/a | | 2,589 | 239 | 311 | 8,448 | 351 | n/a | — |
| 1983 | n/a | | 2,833 | 179 | 190 | 8,459 | 351 | n/a | — |
| 1984 | | | Not available | | | | | | |
| 1985 | 26,008 | 723 | 3,173 | 149 | 164 | 9,161 | 526 | 206 | 40,110 |
| 1986 | n/a | | 3,496 | 185 | 205 | 10,161 | 596 | 249 | — |
| 1987 | n/a | | 3,836 | 225 | 245 | 10,867 | 590 | 250 | — |
| 1988 | 30,000 | | 4,388 | 258 | 327 | 11,385 | 704 | 250 | 47,312 |
| 1989 | | | not reported yet | | | | | | |

Source: Civil Aviation Statistics of the World — ICAO Annual Publication.

## Table 4 — United Kingdom Airline Total Accidents Fatal Accidents and Rates 1980-1987

Fixed Wing aircraft over 50,600 pounds (23,000 kg) MTWA only

| Year | State Flight (000) | Revenue A/C KM's 000,000 | Revenue A/C Hrs 000 | Reportable Accidents Total | Fatal | Rate per 100,000 hrs. Total | Fatal |
|---|---|---|---|---|---|---|---|
| 1980 | 577.8 | 588.7 | 970.2 | 9 | 2 | 0.86 | 0.19 |
| 1981 | 530.5 | 555.3 | 971.8 | 7 | 1 | 0.72 | 0.10 |
| 1982 | 531.2 | 522.8 | 931.8 | 4 | - | 0.43 | - |
| 1983 | 646.6 | 518.7 | 932.8 | 4 | - | 0.43 | - |
| 1984 | 579.2 | 563.0 | 1,004.4 | 9 | - | 0.90 | - |
| 1985 | 589.8 | 576.7 | 1,024.2 | 4 | 1 | 0.39 | 0.10 |
| 1986 | 616.3 | 618.0 | 1,092.7 | 10 | 1 | 0.97 | 0.10 |
| 1987 | 660.8 | 675.6 | 1,190.9 | 4 | - | 0.34 | - |
| 1988 | 714.6 | 727.3 | 1,294.1 | 11 | - | 0.85 | - |

## Table 5 — United Kingdom General Aviation Total Accidents, Fatal Accidents and Rates 1980-1989

Fixed Wing Aircraft under 12,500 pounds (5,700 kg) MTWA

| Year | Reportable Accidents Total | Fatal | Estimated Hrs (x1,000) | Rate per 100,000 hours Total | Fatal |
|---|---|---|---|---|---|
| 1980 | 189 | 15 | 652 | 29.0 | 2.3 |
| 1981 | 179 | 18 | 640 | 28.0 | 2.8 |
| 1982 | 128 | 9 | 620 | 20.6 | 1.5 |
| 1983 | 169 | 19 | 634 | 26.5 | 3.0 |
| 1984 | 149 | 11 | 669 | 22.3 | 1.6 |
| 1985 | 140 | 16 | 684 | 20.5 | 2.3 |
| 1986 | 168 | 12 | 698 | 24.0 | 1.7 |
| 1987 | 173 | 27 | 713 | 24.2 | 3.8 |
| 1988 | 180 | 12 | 804 | 22.4 | 1.5 |
| 1989 | 213 | 11 | 965 | 22.1 | 1.1 |

Source: U.K. Civil Aviation Authority.

## Table 6 — United Kingdom General Aviation Total Accident, Fatal Accidents and Rates 1980-1989

Rotary Wing Aircraft under 5,700 kg MWTA

| | Reportable Accidents | | Estimated | Rate per 100,000 hours | |
|---|---|---|---|---|---|
| Year | Total | Fatal | Hrs (x1,000) | Total | Fatal |
| 1980 | 19 | 0 | 82 | 23.2 | 0 |
| 1981 | 16 | 2 | 89 | 18.0 | 2.2 |
| 1982 | 19 | 2 | 100 | 19.0 | 2.0 |
| 1983 | 21 | 5 | 94 | 22.3 | 5.3 |
| 1984 | 27 | 3 | 109 | 24.8 | 2.8 |
| 1985 | 14 | 0 | 116 | 12.1 | 0 |
| 1986 | 15 | 1 | 124 | 12.1 | 0.8 |
| 1987 | 14 | 1 | 131 | 10.7 | 0.8 |
| 1988 | 23 | 0 | 150 | 15.3 | 0 |
| 1989 | 30 | 3 | 150 | 20.0 | 2.0 |

Source: U.K. Civil Aviation Authority.

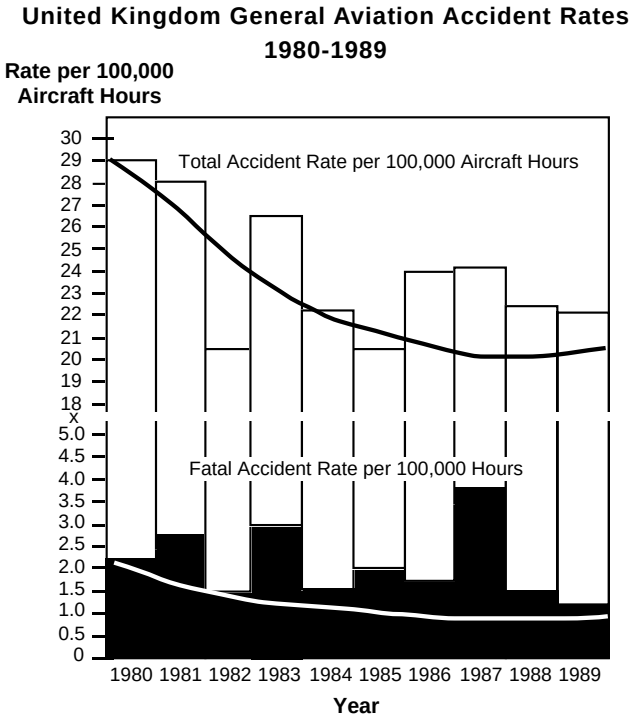



**Figure 7**

Table 5 shows the general aviation fixed-wing aircraft total accidents, fatal accidents and rates, and Table 6 shows the rotary wing aircraft total accidents, fatal accidents and rates for the past decade. The safety record for 1989 was not encouraging, particularly because the total and fatal accident rates for rotary aircraft were much higher than those recorded in the preceding four years. However, apart from the year-to-year variation, the overall accident rates of U.K. general aviation have declined since the early 1980s. Figure 7 depicts the 10-year trends of both total and fatal accidents. ♦

# Reports Received at FSF Jerry Lederer Aviation Library

## Books

*Security Intelligence Sourcebook — including Who's Who in Terrorism* / Frank G. McGuire. — Silver Spring, MD : Interests, Ltd., 8512 Cedar Street, Silver Spring, MD 20910-4322 U.S., c. 1990. 304p., ill. ISBN: 0-929457-02-1.

Key Words
1. Terrorism.
2. Terrorists.
3. Aeronautics, Commercial — Security Measures.
4. Aeronautics, Commercial — Terrorism.

Partial Contents: Introduction — Overview and Perspective — Terrorism: Defining the Term — HumInt and Beyond in Counter-Terrorism — Domestic Intelligence Gathering From Subversive Groups and Inside Prisons — Key Points in Executive Protection — How to Calculate the Cost of a Life — Aviation Security — The Pam Am 103 Bomb — USSR Pushes Aviation Security Upgrade — Crisis-Free Crisis Management — Plastic Explosives Data — Recent Terrorist Bombs — Airliner and Nuclear Site

Diagrams — What Is Political Extremism — International Groups — Active Terrorist Groups — Domestic Terrorism — Who's Who in Terrorism — Statistics on In-Flight Explosions — President's Commission on Aviation Security: List of Airline Bombings.

Summary: "This sourcebook is intended for use by security intelligence professionals in carrying out their responsibilities for protecting lives and property. It provides selected reference materials on perspectives, techniques, incidents, weapons and tactics, targets such as aircraft and nuclear facilities, group activities, group and individual identification and backgrounds, and a wealth of other basic data." [introduction]

## Reports

*Aircraft Accident Report: United Airlines Flight 811, Boeing 747-122, N4713U, Honolulu, Hawaii, February 24, 1989*. — Washington, D.C.: National Transportation Safety Board; Springfield, Va.: Available through NTIS*, April 16, 1990. Report NTSB/AAR-90/01, PB90-910401. 72p.

Key Words
1. Aeronautics — Accidents — 1989.
2. Aeronautics — Accidents— Cargo Doors.
3. Aeronautics — Accidents — Maintenance and Inspection.
4. Airplanes — Design and Construction
5. Airplanes— Airworthiness.
6. United Airlines — Accidents — 1989.

Summary: United Airlines, Flight 811, Boeing 747, Los Angeles, California, to Sydney, Australia, 3 flightcrew, 15 flight attendants, and 337 passengers aboard the airplane. After leaving Honolulu, and climbing between 22,000 and 23,000 feet, a "thump" was heard which shook the airplane. Flightcrew said that this sound was followed immediately by a "tremendous explosion." Nine of the passengers were ejected from the airplane and lost at sea. The NTSB determined that the probable cause of this accident was the sudden opening of the improperly latched forward lower lobe cargo door in flight and the subsequent explosive decompression. The explosive decompression caused extensive damage to the fuselage and cabin structure adjacent to the door. Contributing to the cause of the accident was a deficiency in the design of the cargo door locking mechanisms, which made them susceptible to inservice damage, and which allowed the door to be unlatched, yet to indicate a properly latched and locked position. Also contributing to the accident was the lack of proper maintenance and inspection of the cargo door by United Airlines, and a lack of timely corrective action by Boeing and the FAA following the 1987 cargo door opening incident on a Pan Am B-747. The Safety Board issued three safety recommendations (A-89-92 through -94) as a result of this investigation.

## Reference

*Federal Aviation Regulations, Part 135* - Air Taxi Operators and Commercial Operators, Change 35, effective February 25, 1990, and effective April 5, 1990. — Washington, D.C. : U.S. Federal Aviation Administration.

Key Words
1. Aeronautics, Commercial — Law and Legislation.
2. Aircraft — Seating — Law and Legislation.
3. Aircraft Cabins — Emergency Exits.
4. Aircraft Cabins — Smoking — Law and Legislation.

Summary: This change incorporates Special Federal Aviation Regulations (SFAR) 50-2, Special Flight Rules in the Vicinity of the Grand Canyon National Park, effective April 5, 1990, and two amendments in Federal Aviation Regulations (FAR) Part 135: Amendment 135-35, Prohibition Against Smoking, effective February 25, 1990; and Amendment 135-36, Exit Row Seating, effective April 5, 1990.♦

*U.S. Department of Commerce
National Technical Information Service (NTIS)
Springfield, VA 22161 U.S.
Telephone: (703) 487-4780.

# Accident/Incident Briefs

*This information is intended to provide an awareness of problem areas through which such occurrences may be prevented in the future. Accident/incident briefs are based upon preliminary information from government agencies, aviation organizations, press information and other sources. This information may not be accurate.*


## Is That GPWS For Real?

*Boeing 737: No damage. No injuries.*

The aircraft was flying in clouds during an instrument approach when the ground proximity warning system (GPWS) twice sounded an alert. After the first alert, the crew initiated a climb to a safe altitude. Then, believing the warning was invalid, they resumed the descent. Four minutes later, the airport controller warned the crew that the aircraft was well east of the intended approach course; about the same time, the second GPWS alert sounded. The aircraft again was flown to a safe altitude. Another approach was flown and the aircraft was landed without incident.

Investigators determined that the captain misselected the VHF navigation transfer switch and the pilots did not confirm that the selection was correct, nor did the crew use all available aids during the approach. Contributing factors included the lack of a positive indication of the source of navigation information displayed on the horizontal situation indicator, the crew's lack of familiarity with the aircraft's cockpit configuration and inadequate training and operational guidance provided by the company. The air traffic controllers were also cited for not ensuring that the crew was aware in a more timely manner that the aircraft had deviated from the published approach course.

## Little Lights Can Cause Big Problems

*Lockheed L-1011 TriStar: Minor damage. No injuries.*

During taxi for takeoff, the aircraft was backtracked along the runway. While turning at the end of the runway, the right-hand main wheel tires rolled over some raised runway edge light fixtures. There was no turning circle and the published width of the runway is 150 feet.

The pilot of the aircraft continued the taxi to line up on the centerline and the takeoff was without further incident. The flight was completed normally. Note was made of the incident in the aircraft maintenance log and an inspection of the starboard main wheel tires was requested. The maintenance engineer who inspected the tires reported that he considered both tires to have been cut sufficiently that they could have deflated at any time. He reported that the tires should have been replaced before departure. The two damaged tires were scrapped and the hubs were overhauled before being returned to service.

The pilot was counseled that the aircraft should be returned for inspection following such an incident. His decision to continue had been influenced by lack of spares and passenger handling facilities at the departure airport, a commercial consideration that was counter to the safety of the operation, according to the carrier's flight manager.


## Rough Weather Causes Distraction

*Piper PA-31-350: Minor damage. No injuries.*

The aircraft was approaching to land, with the pilot handling the controls under the supervision of a training captain. It was 2130 hours on a mid-March night in England.

Locally severe turbulence was encountered about eight nautical miles from the runway threshold. At five miles the instructor pilot saw the pilot select the landing gear lever to the down position, but reported that he was distracted by a momentary illumination of the door unsafe light. After confirming that the door was secure, the pilot returned his attention to the landing approach which appeared to be normal.

As the pilot began the landing flare, a slight scuffing sound was heard. The training captain immediately took over and called for full power and made a go-around, entering a left-hand pattern for another landing attempt. The gear lever was recycled up and down again. The gear extended and three green lights illuminated. The following landing was normal, but inspection after the aircraft was parked revealed that the propellers were damaged because they had struck the runway during the first landing attempt. The ADF antenna mounted on the rear fuselage also had been damaged.

During debriefing, the training captain reported that he had noticed no red or green gear indicator lights during the first approach and that the landing gear warning horn had not sounded. At no stage in the first approach had the manifold pressure of either engine been reduced below 12 inches, the point below which the warning horn is activated with gear up. He confirmed that the gear warning circuit breaker had not been pulled out during the flight, and offered the opinion that the other pilot may not have moved the landing gear lever far enough into the down position just prior to the door unsafe light distraction.

## No Safe Way Through the Pass

*de Havilland DHC2 Beaver: Aircraft destroyed. Fatal injuries to one.*

The pilot was flying the non-scheduled cargo aircraft up an Alaskan valley intending to cross a pass during the early morning daylight in August.

Approaching the 2,745-foot-high pass, the pilot encountered clouds at his flight level and attempted to make a 180-degree turn to return along the route he had flown. However, the aircraft stalled and impacted terrain at a 40-degree slope in a steep, nose-down but nearly wings-level attitude.

The aircraft was destroyed and the pilot, the only occupant, was fatally injured. Causal factors included the presence of instrument meteorological conditions, mountainous terrain and loss of control of the aircraft.


## The Mystery of the 'Up' Gear Lever

*Beechcraft Model 58 Baron: Moderate damage. No injuries.*

The aircraft was cleared for a straight-in approach after a cross country pleasure flight. The 1,300-hour private pilot was accompanied by one passenger, who also held a private pilot license.

About a mile out on final, landing gear was extended and flaps were selected down in progressive increments. Both occupants confirmed the presence of three green gear-down lights.

When the pilot applied the brakes after having made a gentle touchdown, the nose landing gear collapsed followed by the two main gear. There was no fire and no one was injured. The aircraft sustained damage to the underside of the fuselage and to the propellers, landing gear and flaps.

While the two occupants were exiting the aircraft, the pilot noticed that the landing gear selector lever was in the up position. Neither of the two pilots had remembered touching the gear lever after it had been placed in the down position on approach, either in the air or on the ground, even though they had to climb over the seats to evacuate the aircraft through a rear door because the front door was jammed shut.

## Flying Before The Storm — Almost

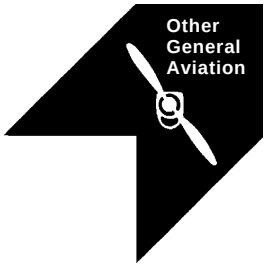
*Cessna 421: Moderate damage. No injuries.*

The aircraft had cleared Customs at a coastal airport after flying from France to England. The pilot was preparing to depart for an inland airport, a grass strip approximately 2,000 feet long.

The weather was generally VFR but the pilot was aware of a spring rainstorm to the north of his course. The area of poor weather was headed toward his destination but be estimated that he would arrive ahead of it and be able to land without being affected by weather problems.

Upon arrival at his destination at approximately 1820 hours, the pilot set up an approach to runway 25; there was a light wind from the southwest. The touchdown was normal but, as soon as the pilot applied braking he recognized that he had not, after all, beat the storm. The grass runway was wet and very slippery, evidence that the storm had already passed over the field.

The pilot realized that he would not be able to stop the aircraft before the end of the runway by normal braking, so he ground-looped the aircraft to the left in an attempt to stop in a shorter distance. This maneuver was only partially successful and the aircraft continued to the left and stopped with the left wing stuck in a hedge on the southern edge of the airport. The aircraft suffered damage to the left wing, fuselage, tail and left main landing gear. There were no injuries to the pilot or any of his three passengers.




## Late, Long And Unlucky

*Piper PA-28-180: Moderate damage. No injuries.*

The pilot was approaching for a full-flap landing in light wind conditions. The runway length was 2,000 feet, of which slightly more than 1,600 feet were declared usable. A road bordered by hedges on both sides crossed the extended runway centerline at the boundary of the airport.

The aircraft touched down long, and the pilot was concerned that he might not be able to stop before the end of the runway with the absence of a headwind, so he attempted to raise the flaps and go around. However, the landing gear hit the first hedge adjacent to the road and the aircraft impacted the second hedge before coming to a stop approximately 1,200

feet beyond the road.

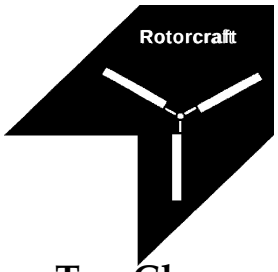
## Pilotage A 'Lost' Art?

*Reims Cessna F152: Substantial damage. Minor injuries to two.*

The private pilot made numerous navigational errors during the cross-country flight caused by mis-identification of ground features. The result was a large deviation from the intended course.

The situation was compounded when the pilot mistakenly identified an island where his intended destination airport was located; he spent substantial time trying to find the airport which was not there. A critical shortage of fuel finally necessitated a precautionary landing.

The pilot selected a field for his landing that was plowed. Fortunately, the furrows ran parallel to the wind and he made a gentle touchdown. However, when the nosewheel was lowered to the surface, it dug into the soft earth and the aircraft nosed over onto its back. There was no fire. The two occupants, who were using lap and shoulder harnesses, were able to evacuate the overturned aircraft with only minor injuries. The wing roots and nose gear of the aircraft were broken, and the engine and the tail assembly were damaged.




## Too Close For Comfort

*Aerospatiale SA-365: Damage to rotor blades. No injuries.*

The rotorcraft landed at a main road intersection adjacent to a hospital to deliver a patient after an aerial ambulance flight. The two roads had been closed to traffic by police and, in order to relieve the traffic situation as quickly as possible, the helicopter was to be flown to a nearby park to wait for the return of the doctor and paramedic who had accompanied the patient on the flight to the hospital.

During the takeoff for the repositioning flight, however, the main rotor blade tips brushed some trees. There appeared to be no adverse effect on control of the aircraft; the pilot elected to continue the takeoff and landed in the park as planned. After the engine had been shut down and the rotors had stopped, the pilot inspected the main rotor blade tips which had to be replaced because of damage.

## Helicopter Pulls The Plug at Show

*MBB BO-105: Minor damage. No injuries.*

The rotorcraft was being used in support of police operations at a public show ground. There had been complaints about downwash and noise during the first day of the event and officials decided upon a different helicopter operating site without consulting the crew.

The takeoff path from the new site was obstructed at the upwind end by a four-foot hedge below power cables that were supported by 35-foot-high poles. Since there was not sufficient distance available to take off over the cables, the pilot decided to air taxi below them before beginning takeoffs, a technique in which he had earlier received training. Several successful departures were made using this technique.

After his last departure, however, the pilot was advised by radio that the show had lost electrical power. He returned to the takeoff site and reported that the power cables beneath which he had been air taxiing were severed. He landed and inspected his aircraft, and discovered slight damage to both tail rotor blades. He attributed the cause to premature rotation into the takeoff maneuver without ensuring that the tail rotor was clear of the cables. ♦