

From P K Ray

SAFETY IN MODERN AIRCRAFT

Air travel is essential for the economy of our modern world. Business is conducted all over the planet and goods are traded between nations far apart. More than ever, the global community that has grown over the last fifty years relies on the speed and ease of air travel to spread its cultural message.

Global air travel — once the domain of the rich and famous is now accessible to the average person. For clear indication of just how important it is in our lives, one has to look in further than September 11, 2001, when air travel in U.S.A. was suspended for some time, creating enormous problems for millions of people. Although this event was brought upon by horrific acts of violence, it highlights how much we depend on the ease of travel around the world. As the air travel grows, its future depends increasingly on the reduction of accidental rate so that air travellers around the world would be assured of safe arrival at their destinations.

“The Aircraft is designed by million people and none of them is infallible”. Therefore the

aircraft cannot be totally infallible. But we can always design the aircraft which will not go to accident mode because of one system failure. Modern aircraft design is based on “fail safe” or “safe fail” philosophy and it requires in most of the cases three or more failures to have an accident.

Since the launch of the first jet airlines, the De'Haviland comet in 1949, the aircraft industry has encountered more than its fair share of criticism and praise. In the past forty years alone, the structural design and mechanical integrity of aircraft have been continually on the rise to increase safety, speed, efficiency and business. Unfortunately, the rate of aircraft accidents has also been climbing steadily, the reason being the air travel has become lot more common. As a result, airline companies not only put more aircraft to use, they also develop bigger cabins to accommodate more people, increasing the possible severity if a crash was to occur.

Still the improvement in aircraft technology has yet to be matched by any other mode of

transportation, fuelling the belief that the air travel is still the safest and most cost effective form of travel. When taken into account, the total number of kilometers travelled by a passenger in a year, a person is less likely to die in an air crash than in a road, train or ship accident. Needless, to say, aircraft accidents do happen — killing on an average 1500 people a year and the designers, maintenance engineers, pilots and in fact everyone in the aviation industry is constantly taking actions to prevent the recurrence of similar accident.

Statistically, almost 80% of air crashes are due to human error in understanding aircraft systems and emergency procedures followed by 11 % due to maintenance error and mechanical failure with the remainder being made up by sabotage, bad weather and others. Despite these categories, it can be said that the 11 % of the total number of accidents owing to maintenance and mechanical failure can also be attributed to human error, as an aircraft can only be as reliable as the engineer that creates and

maintains it. After air accidents, the intention of analyzing the accidents should not aim to pinpoint that is at fault, but to find out what went wrong so that preventive actions can immediately be taken.

Today's modern wide body aircraft carries some times more than 500 people and cruising at about 85% of the speed of sound at an altitude of 40,000 ft. The total weight could be as high as 500,000 kg, including about 16,5000 kg of fuel it carries. From the design and operation points of view, these aircrafts have been designed very safe, duplicating and replicating each systems and automatic faultfinding and rectifications in flight is very common. It's really a wonder that such a big bird is flying more efficiently than real birds.

Statistics highlight two facts: that travel by air is extremely safe (compared to other modes of transportations), and that the fatality rate has been on decline since the dawn of the jet age (deaths per passenger-kilometer). Both of these are

directly attributed to the wisdom and dedication of those working in the aviation industry.

The critical analysis of major aircraft accidents plays a pivotal relentless pursuit of increased aviation safety. It involves identifying key elements of a crash from which a preliminary hypothesis may be reached followed by a thorough examination of the probable areas of error or malfunction. This can be a long and arduous process, often taking several months before any conclusive findings are established. Once found, however, they form an invaluable contribution to the improvement of the safe and efficient use of aircraft all around the world.

The aircraft is designed, manufactured, maintained and operated by the experts in their own field. It is expected to perform efficiently within their specified safety limits. Poor repair, maintenance or modification can compromise these safety standards and often only discovered when it is too late.

Aviation regulators like ICAO (International Civil Aviation Organization), FAA (Federal Aviation Administration), Civil Aviation Authority (CAA) are constantly regulating and monitoring the design, production, operation and maintenance of aircraft throughout the world to keep the aircraft safe.

So until next time have a nice flight.

P K Ray,
Senior Lecturer
Department of Aerospace
Engineering
RMIT University, Australia.
