
With the correct mental attitude and proper training, safe landings become standard procedure.

The Right Approach

by Richard Brice

EDITOR'S NOTE: The following article, written by Federal Aviation Administration (FAA) inspector, Richard Brice, provides a unique glimpse into the development of safer flying techniques. Mr. Brice was principal FAA inspector assigned to Frontier during the late 1950s and early 1960s. He is presently a Boeing 747 inspector primarily assigned to United Air Lines. Recently Mr. Brice was asked to speak before Avianca Airline pilots in Bogota, Colombia, on approach and landing techniques for all the airline's aircraft, including the Boeing 747.

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I'm happy to say I didn't find this to be the case with Frontier's flight crews when I was assigned to the airline. They've cooperated in a unique program to reduce risks during the most critical period of any flight, namely the approach and landing phase.

The Need For Standards

Prior to my employment in 1957 with the FAA's predecessor, the Civil Aeronautics Administration (CAA), I served as pilot-in-command on Douglas DC-6Bs assigned to the Military Air Transport Command (MATS). I flew from the United States to all points of Europe and the Far East, including Japan. When not flying scheduled trips, I instructed on the DC-6B,

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The North Atlantic operation was quite a contrast from my previous assignment. Then I flew mostly from Travis Air Force Base, near San Francisco, to Tokyo via Honolulu, Hawaii and Wake Island.

On the Pacific trips, crews pretty much did their own thing when conducting the approach and landing phase of the flight. Weather usually was not a problem and most landings were made with good visibility and ceiling. In fact, the majority of time weather was clear.

The North Atlantic was quite a different story. Flying it is survival of the fittest. The Azores, for example, are noted for severe crosswinds occasionally compounded by driving rain. England is plagued with frequent fog as thick as split pea soup. The whole continent of Europe, particularly during the winter, has many periods

Krebs Uptown Photography



FAA Inspector Richard Brice

of low visibility. This often requires pilots to execute approaches down to the lowest allowable altitude—and usually after being in a patience-straining holding pattern for long periods of time.

The fact that foreign traffic controllers give clearances in broken English only adds to this stress. The 1977 KLM-Pan Am ground collision in the Canary Islands stands as a grim example of what can happen if clearances are misunderstood.

So it was only natural for me to realize that cockpit discipline, coordination and alertness were synonymous with safety. Numerous trips with crew members I had never flown with before impressed on me the need for quality training and standardized procedures, especially during approach and landing.

A Daily Habit

I went to work for the CAA in 1957 and was assigned to Frontier as an inspector. I noticed some variance

As the aircraft approaches the runway (right), Captain Ruehle monitors all flight instruments. Every approach and landing, day or night, good weather or poor, is executed with the same cockpit discipline.

(Below) Frontier Captain, Walt Ruehle, reads the checklist during the approach to Winnipeg, Manitoba. Captain Ruehle allowed the first officer to make this approach and landing.



in cockpit techniques and discipline by Frontier crews. After discussing this with Frontier's management, many improvements were made during the next few years. When the airline industry began replacing piston-powered aircraft with more complex modern jet-powered aircraft the "revolution" in approach and landing techniques took place.

Frontier was ready for the jet age before the first jet-powered aircraft joined its fleet. In the late 1950's, Captain Elmer Burson, Chief Pilot in Phoenix, and I spent many hours discussing various changes in operating procedures that would be required when Frontier replaced its Douglas DC-3's with modern aircraft.

In 1960, Captain Chick Stevens became Supervisor of Flight Training. Shortly, thereafter, Captain Ken Dealy was named Director of Training. Burson, Stevens, Dealy and I developed Frontier's present approach and landing procedures.

In recent years the National Transportation Safety Board has

made many recommendations for cockpit coordination and discipline during approach and landing. Their recommendations have been almost identical to the procedures we developed earlier for Frontier.

Before the present approach and landing procedures were adopted, we discussed the proposed changes with all chief pilots and most crew members. Our goal was to develop good habits through training. We found the best training is accomplished during line operation on a daily basis, with each pilot observing the other in a competitive professional manner.

The procedures can be broken down into two parts:

- *Stabilized Approach.* The aircraft is flown on the approach at a constant airspeed and a constant rate of descent from 500 feet above the ground to touchdown.

- *Standardized Approach and Landing Technique.* The crew is trained to perform duties by habit with a high degree of discipline. This overcomes any tendency toward complacency. It also devel-

ops a high degree of skill and creates an atmosphere of competition to make a perfect approach and landing. Every approach and landing, day or night, good weather or poor, is conducted with the same cockpit discipline. Habits are formed, and each approach and landing is treated as if made under the worst conditions possible.

Memory Aids

Captain Pete Lamkin—then a Frontier check airman—developed a procedure using *mnemonics*, a word derived from the Greek goddess of memory, Mnemosyne. Mnemonics is simply a technique of improving the memory. Captain Lamkin's mnemonic, adopted by Frontier to assist during approaches, is: WEST COAST RAIL ROAD.

- WEST is a reminder to check the latest *Weather*. All facets of weather are considered, such as landing minimums, wind, runway conditions.

- COAST stands for *Checklist and Clearance*. It's a reminder to read the descent and approach checklist and review the clearance for proper approach procedure.

- RAIL is the reminder to tune and identify *Radios* needed for the approach.

- ROAD is the reminder to *Review* the approach plate (a diagram depicting pertinent airport and arrival procedures) for field elevation, minimum descent altitude and the missed approach procedure.

WEST COAST RAIL ROAD has created a thinking process. It develops, in an orderly manner, a time when certain actions must be taken. Because of the relaxed activity during cruise, a crew coming out of an enroute cruise condition usually does not have an accelerated thinking process. This is when the thinking process must be stimulated, and WEST COAST RAIL ROAD does the job.

The Human Element

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The FAA and Frontier Flight Operations like to see smooth landings. But this is not the only means of measurement. Precision flight profile to the exact point of touchdown on the runway is first and foremost. The dark spot on the runway, approximately 1,000 feet from the approach end, is the proper point of touchdown. The aircraft is in a perfect position to touch down at this spot.



Photo by Captain Chick Stevens

human factors—how a pilot reacts and is capable of reacting during the approach and landing phase.

When working with human beings and aircraft, incapacitation of a crew member in flight is always a concern. Frontier's approach and landing technique was developed with this in mind. Crew members are disciplined to operate in such a way that it's obvious to the other crew member if partial incapacitation, such as fatigue or even depression, is becoming a problem.

As an FAA inspector, I found the confidence developed among Frontier's crews by the present approach and landing technique caused the Frontier pilot group to be very strong and aggressive on periodic flight checks. The non-proficient pilot stands out among his fellow airmen. Pride causes him to perfect his act.

In developing the approach and landing technique, priority was given to making pilot reaction a habit, a kind of automatic reflex. It's not that of a robot, but of a

person trained to perform with instant and correct logic. The technique also allows both pilots to work as a team. Each person knows what the other is doing at all times.

Making The Change

As with most new ideas, there was some initial resistance to the new procedures. We soon concluded that oral discussions would not convince skeptics of the merits of proposed changes in operating procedures.

It was then decided that Captain Chick Stevens would demonstrate, during actual flight, the new approach and landing techniques to as many members of the pilot's Air Safety Committee, chief pilots and line pilots as feasible. After the demonstrations were concluded, the procedures were adopted in 1965. They became standard operating procedures for Frontier's Boeing 737 and Convair jet-prop 580 fleets.

The approach and landing tech-

nique, once adopted, has since required little supervision by the FAA or Frontier management. Individual pilot's desires to be professional and follow standard operating procedures have had a standardization effect on all pilots, including the newly hired ones.

Much more technical detail about the procedures could be added. But as far as the average passenger is concerned, it seems only necessary to emphasize that these procedures have made your flight on Frontier safer.

In this respect, I must inject a note of personal gratitude to Captain Chick Stevens. As Supervisor of Flight Training during the gestation and implementation period, he bore the brunt of adverse arguments. But he stuck to his guns. With the backing of the chief pilots and the pilot's Air Safety Committee, his dedication paid off in Frontier's excellent cockpit discipline, alertness and concentration during the approach and landing phase of flight.

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AN ENVIABLE FLIGHT SAFETY RECORD

HON. WILLIAM L. ARMSTRONG

OF COLORADO

IN THE HOUSE OF REPRESENTATIVES

Tuesday, August 8, 1978

• **Mr. ARMSTRONG.** Mr. Speaker, Frontier Airlines, headquartered in Denver, Colo., enjoys an enviable safety record. Vogue magazine recently surveyed the safety records for all major airlines, and concluded that Frontier has the best 10-year safety record. One factor which contributed to achieving this fine record is Frontier's development of systematic landing and approach techniques. My colleagues, many of whom fly millions of miles annually, may well be interested in the following article which details Frontier's efforts to make landings standard procedure.

[From the Frontier Magazine, July 1978]

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(By Richard Brice)

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