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FORUM

LOSS OF CONTROL ON LANDING: WE NEED TO CHANGE OUR MINDSET
A SERVICE-LEARNING PROJECT FOR FLIGHT SAFETY

Ed Randel, Guillaume Le Couteulx, & Jitesh Bahl

ABSTRACT

The accident of FedEx Flight 14 was caused by something that pilots do with alarming frequency, flying an unstable approach. This is a large problem in general aviation, and after reading this analysis it will be apparent that the only way to recover from an unstable approach is to go around. This analysis begins with a description of loss of control on landing and shows how common it is. The details of FedEx Flight 14 are then discussed in length, as well as some of the training and procedures at Federal Express. Then, aviation safety tools, such as the 5-M Model, are applied to the accident to uncover some of the root causes, as opposed to the apparent causes provided by the NTSB. Finally, the action that has been taken locally in the Daytona Beach, FL area will be discussed. This action includes a safety seminar which was held on Embry-Riddle’s campus, as well as an article that was published in the campus newspaper.

INTRODUCTION

The pilots of FedEx Flight 14, which crashed at Newark International Airport on July 31, 1997, succumbed to something that many pilots do on a daily basis, shooting an unstable approach. Every pilot has shot an unstable approach at some point in their time flying, but it does not always end up causing an accident. Many times during training a pilot will initiate a go-around, a maneuver in which he or she adds power and climbs out to try the approach again, but too often the person does not realize why they should do it. The most important thing for a student, or any pilot for that matter, to know is why there was a need for a go-around. If the Captain of FedEx 14 had been able to recognize that his approach had become unstable, this accident could have been avoided. Obviously there were many other factors that were associated with this accident that will be discussed in this analysis, but that fact still holds true.

This analysis of the FedEx Flight 14 accident will discuss the topic of loss of control on landing, explain how commonplace it is today and why it is an important issue to try to correct. Following that will be an overview of the accident, including the official cause stated by the NTSB, as well as what was determined to be the root causes. The data and information gathered from the official accident report will then be related to the topic of loss of control on landing. After providing a thorough explanation of the accident and its root causes, the action that this team has taken locally to help mitigate loss of control on landing accidents will be discussed as an example of student service-learning tied to an academic course. After that is a discussion of some common aviation safety tools and how they can be implemented while researching accidents such as FedEx Flight 14. Finally, a discussion ensues on what can be done by safety activists all around the country to help prevent accidents involving loss of control on landing from occurring will be portrayed.

LOSS OF CONTROL ON LANDING

Many people are aware of the saying “landings are where pilots earn their money”, and some pilots may have even been told this. This saying makes sense because when an average person goes flying, it is common for them to base their pilots’ skill level mainly on the landing. Who has not been on a commercial flight where somebody has cracked a joke about getting the “new guy” because the landing was not as smooth as others they have had before? As it pertains to the aviation industry, mainly pilots, this saying holds true as well because of how much can go wrong while the aircraft is close to the ground. For this reason, it is very important for a pilot to understand the factors that will lead...
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to a stabilized approach and safe landing. FedEx Flight 14, which crashed at Newark International Airport on July 31, 1997, demonstrated what can happen when an aircraft does not make a stabilized approach to the runway. The details of the accident will be discussed in detail in the next section, but it is necessary to mention that it is classified as a loss of control on landing accident.

The easiest way to define many things is to break them up into smaller parts, which is how loss of control on landing will be discussed. The first part of the phrase, "Loss of control...", can be defined as any time that the pilot’s control inputs, desired aircraft reaction, and the actual aircraft reaction are not in sync with one another. This can hold true for both over-controlling, as was the case in the FedEx Flight 14 accident, as well as under-controlling the aircraft. Over-control of the aircraft is more commonly seen, which generally leads to a condition called Pilot Induced Oscillation (PIO), which is when a pilot tries to correct for their previous input with a larger input in the opposite direction. The aircraft then continues to diverge from the desired flight path until it cannot be controlled.

The second half of the phrase, "...on landing," can be more misleading then it may appear at first glance. This does not only pertain to the act of landing the aircraft on the runway surface, but begins well before a flight ever gets to the landing phase. The first thing that can factor into the landing is the quality of the approach briefing. Approach briefings should include enough information so the pilot, or crew in larger operations, has a clear picture of the airport, its surroundings, and what procedures will be used for the approach and landing. If any part of this is not clear, it can lead to an unstabilized approach. The next phase of flight that factors into the landing is the approach to the runway, which must be stabilized by an altitude set forth by the specific operator. An appropriate altitude to be stabilized by for general aviation aircraft is 500 feet. What does it mean to be stabilized? The Flight Safety Foundation states that for an approach to be stabilized, the aircraft must be: configured for landing, on glide slope, within a specific tolerance of the approach speed, able to continue to the runway with minimal pitch and power adjustments, and have a minimal sink rate (Stabilized Approach, 2000). After completing a comprehensive briefing and flying a stabilized approach, the pilot is more adequately prepared to safely and skillfully land the aircraft.

Although the approach and landing only accounts for a small percentage of the total flight time, a large number of accidents occur during this time. A study was completed for the time period between 1984 and 1997 and it was determined that out of 76 loss of control on landing accidents, 66 percent of them were caused by unstable approaches (Stabilized Approach, 2000). Figure 1 is a chart published by the Flight Safety Foundation that shows the leading causes of landing accidents. Unfortunately this type of accident is much more prevalent then is desired and can involve pilots of any skill level.

![Figure 1. Leading Landing Accident Causes (Stabilized Approach, 2000).](https://commons.erau.edu/jaaer/vol17/iss3/2)
The next section of this analysis will summarize the flight as well as a discussion of the flight characteristics. It is important to keep in mind all of the factors associated with loss of control on landing and how it can be avoided.

**SUMMARY OF FLIGHT**

On July 31st 1997, at Newark International Airport, approximately 0132 eastern daylight time, Federal Express Flight 14 crashed while attempting to land on Runway 22R, which has a length of 8,200 feet. Five occupants were on board and only minor injuries were received. Their flight began in Singapore on July 30th, 1997 and was due to terminate at Newark International Airport on July 31st, with stops in Penang, Malaysia; Taipei, Taiwan; and Anchorage, Alaska.

Onboard were the Captain and First Officer, two cabin passengers, and one jump seat passenger. The Captain and First Officer had taken over the final leg of the flight, from Anchorage to Newark. All of the previous landings at the scheduled stops were performed safely. According to the flight plan, the aircraft flew at 33,000 feet, FL 330, with an estimated time enroute of 5 hours and 51 minutes from Anchorage to Newark. It was also noted that the aircraft’s No. 1 thrust reverser, located on the left engine, was inoperative and that the crew was aware of it.

At Newark, visual meteorological condition prevailed with winds from 240° at 10 knots, 10 statute miles of visibility and clouds scattered at 8000 feet. As the aircraft approached final, the Captain, who was flying, disengaged the autopilot and flew the aircraft to touchdown. As he flared the aircraft for touchdown, he lost control of the aircraft suddenly, and impacted the runway, went airborne, and then touched down for the second time with extreme force, followed by the collapse of the right main landing gear. The aircraft came to a rest with the fuselage inverted, and parts scattered on and to the right of the runway.

What happened in this accident? Was this simply flight crew error, or was there more behind the accident? Throughout the following section, the pilot’s personal information, the aircraft and crew’s performance during the approach and landing sequence, the Federal Express training program and finally the cause of the accident, shall be discussed.

**Crew Flight History**

The 46 year old captain was hired by the Flying Tigers in 1979, and became a FedEx pilot in 1989. He held an airline transport pilot (ATP) certificate as well as a type rating in the MD-11. He received his FAA first class medical certificate on April 15th, 1997 and was issued a limitation to wear corrective lenses. His last proficiency check and line check before the accident were on April 15th, 1997 and July 11th, 1997 respectively. The captain had a total of 11,000 hours; 2,621 of which were with Federal Express. He logged 1,253 hours in the MD-11 and had a total of 318 hours as pilot in command of that aircraft. The records also stated that he had failed an upgrade proficiency check ride on October 29th, 1996, but then passed after receiving additional training. He also completed the MD-11 Tail Strike Awareness Training Program twice, once for recurrent training as a first officer on July 10th, 1996 and the second time during his captain upgrade training on November 15th, 1996.

The captain arrived in Anchorage, Alaska the day before the accident from Nevada and stated that he was in good health, received adequate rest, and had no signs of fatigue. He stated that he felt tired at the end of the accident flight but his performance was not affected.

The 39 year old first officer was hired on September 6th, 1994 as a ground service employee and was then transferred to the air operations division in October, 1995. Prior to starting with the company, he was a pilot in the U.S. Navy and a flight engineer for another airline. He had logged a total of 1,911 hours of flight time as a pilot and 1,200 hours as a flight engineer. He held both ATP and flight engineer certificates and was type rated in the MD-11. His last FAA medical certificate was issued on March 25th, 1997 and had received no limitations. His latest proficiency check and line check were on May 18th 1997 and June 28th, 1997.

Prior to the accident, he had logged 3,703 hours of total time, 592 of which were with FedEx and 95 hours were on the MD-11. Records stated that he had also completed the MD-11 Tail Strike Awareness Training Program on May 6th and 10th, 1997. The first officer had been off duty for 2 days in Anchorage and he stated that he had 8 hours of rest the day before the accident and did not feel fatigued at any time during the flight. If it was not crew fatigue, what actually led to the accident? Next, the aircraft and crew’s performance must be analyzed.

**Aircraft & Crew Performance**

During the final approach segment, the aircraft was stabilized for much of the approach to Runway 22R at Newark. At 1,200 feet the captain disengaged the auto pilot, left the auto throttles engaged, and hand flew the aircraft to touchdown. With the auto throttles engaged, the throttles are automatically reduced to idle thrust, when the aircraft descends through 50 feet of altitude. According to the flight data recorder, the aircraft maintained an airspeed of 158 knots, with flaps set to 50°, and the landing gear deployed. The aircraft had a vertical speed of 800 feet per minute, a 2° to 3° pitch up attitude, and the throttles set between 55° to 58° thrust resolver angle (TRA). The TRA corresponds to...
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the total travel of the throttles, with 41° being idle thrust and 85° nearing full thrust.

As the captain initiated the flare at 38 feet, the aircraft's pitch increased to 4.9°, while the thrust and airspeed decreased, and the vertical acceleration increased to 1.18 G's. As the aircraft passed through 17 feet, the captain pitched the nose down causing vertical acceleration to decrease to 0.93 G's while descending through 7 feet. Suddenly, the captain increased thrust, pitched the nose up, applied left rudder deflection along with a right wing down aileron deflection, and touched down 1,126 feet beyond the runway threshold. Then the aircraft went airborne. Half a second later the captain reduced power and pitched the nose back down while applying more left rudder and right wing aileron deflection. The aircraft impacted the runway for the second time 1,889 feet beyond the runway threshold, at 1.70 G's, causing the right main landing gear to collapse. Following that, the aircraft ruptured; resulting in wreckage being scattered, 5,126 feet beyond the threshold and 580 feet to the right of the centerline, with the fuselage coming to rest inverted slightly to the right of the runway.

![Diagram of aircraft debris analysis](https://commons.erau.edu/jaaer/vol17/iss3/2)

_Figure 2. Aircraft Debris Analysis (NTSB, 2000)._
Despite the instability of the final portions of approach, the crew did not execute a go-around. Before determining the root causes of this accident, some of the training programs which the crew had received, specifically for the MD-11, warrant attention.

**FedEx MD-11 Tail Strike Awareness Training Program**

The purpose of this program, which began in June 1996, was to increase awareness of tail strikes which commonly occur on the MD-11, as well as to show how to prevent them. The program focuses on how to maintain a proper sink rate, recover from a bounce, and other low level ground techniques. This program stated that “25 percent of MD-11 tail strikes to date have occurred on takeoff and 75 percent on landing.” Generally, tail strikes occur on landing when the aircraft’s flaps are configured to 35° and 50°, but can also occur when the center of gravity is either too far forward or aft, the aircraft is very light or heavy, and by having over serviced struts. The instructor’s guide for this program states that if an unstable approach or bounce occurs, a go-around should be initiated. Pilots tend to attempt to decrease a high sink rate during an approach, by increasing the pitch attitude. This actually increases the effective weight of the aircraft and the vertical acceleration, which will then compress the main gears even further, thus causing the aft fuselage to strike the runway. The program also notes that pilots should avoid holding the “aircraft off in an attempt to achieve a smooth landing.” Holding the aircraft off of the runway will result in a longer touchdown, increase in braking, and a higher pitch attitude which can cause a tail strike (NTSB, 2000).

So how do pilots perform a normal landing in the MD-11? The procedure states that pilots should aim to touch down 1,500 feet beyond the runway threshold. At 30 feet of altitude, pilots should initiate a 2.5° flare attitude, which will transition the aircraft into the landing attitude. By this time, the aircraft will be below 10 feet and the pilot should maintain a constant attitude by releasing some of the elevator back pressure. In this accident, however, the Captain did not follow this procedure. Even having taken the training program, the Captain was still unable to land the aircraft safely. In August, 1997, FedEx implemented a 25 minute video to reinforce the tail strike awareness and go-around techniques.

**Cause of accident**

The NTSB concluded that “the captain’s over control of the elevator during the landing and his failure to execute a go-around from a destabilized flare were causal to the accident. Contributing to the accident was the captain’s concern with touching down early to ensure adequate stopping distance.” The captain’s over control of the aircraft resulted in a classic case of pilot induced oscillation (PIO). In addition, the captain’s landing procedure was inconsistent with the Federal Express MD-11 training program. Furthermore, the captain was concerned about the landing distance on the runway which was calculated by the Airport Performance Laptop Computer (APLC). The crew did not recognize the miscalculated stopping distance, causing the captain to feel the need to touch down earlier on the runway.

So how could an experienced crew miscalculate the stopping distance? Analytical tools such as the 5-M model and the Reason Model can be applied to the accident information to determine root causes.

**FLIGHT SAFETY CONCEPTS**

The history of flight safety and accident investigation has been punctuated by the appearance or the application of concepts such as the Five-M Model, introduced after World War I, the Reason Model, which appeared in the 1990’s and also the Seven Human Factors which can affect pilot performance. Analyzing an accident is directly linked to the use of those concepts to help investigators and safety activists better understand an accident and determine all of the key elements that led to it. The following paragraphs show how the three previously mentioned concepts can be applied to the FedEx Flight 14 accident.

**The 5-M Model applied to the FedEx Flight 14 accident**

The 5-M Model helps to better understand what could have led to an accident (Wells & Rodrigues, 2003). It is divided into five parts: Man, Machine, Medium, Mission and Management, as shown in Figure 3.
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Those five M’s, which are linked together, must comprise all the elements that may be analyzed in order to determine factors that can be considered causal in the accident.

The first area of the 5-M Model that will be discussed is Man. In the FedEx Flight 14 accident, the captain’s skills were relevant because he over-controlled the aircraft and experienced loss of control on landing. Moreover, the loss of control of the aircraft was induced by other elements such as the misinterpretation of the information given by the Airport Performance Laptop Computer (APLC), which led the crew to believe that Runway 22R was not going to be long enough. Concerned about the runway length, the captain wanted to touch down before the aiming points of the runway, which finally led to the loss of control of the aircraft.

After looking into “the Man”, it is important to look into the Machine aspect of the 5-M Model. Training sessions have been set up in the airline industry to help make pilots aware of the undesirable characteristics of the MD-11. Some of these characteristics include: pitch up attitude when spoilers deploy at landing, which can lead to tail strikes, and “relaxed stability” caused by a CG further aft than the other civilian airplanes (Boser, 2002). All of these elements may have led the captain of FedEx Flight 14 to over-control the aircraft. As if those characteristics did not provide enough issues, on the day of the accident, a thrust reverser was inoperative. This led to the crew thinking that the landing distance was going to be longer than the one given by the APLC, but this is not the case because thrust reversers are not factored into the official landing distance requirement. MD-11s are also fitted with a Flight Control Computer (FCC) which dampers the orders sent to the flight controls. The intent is to “match the handling characteristics of the MD-11 to those of the existing DC-10 and the DC-10 newly developed two-pilot adaptation, the MD-10” (NTSB, 2000). The FCC design must be analyzed in order to determine the role it may have played in the accident.

The third area that must be discussed is the Medium,
which has to do with the role the environment and time played in the accident. FedEx Flight 14 was due to arrive in Newark at night and visual meteorological conditions existed at the time of arrival. Runway 22R at Newark International Airport, and more importantly, its length, contributed to the crew being worried about the landing distance. This factor led to the crew’s desire to touchdown early and contributed to the accident.

Now that the man, machine, and medium have been discussed, the next area to look at is the mission. As was discussed earlier, FedEx Flight 14 was set to land in Newark after departing Singapore a day earlier and making three stops along the way. The goal of any flight is to safely execute all aspects of that flight and land safely at the destination. The crew, after having misinterpreted the information given by the APLC, decided that the only way to land safely was to touch down early.

The Final section of the 5-M Model that needs to be discussed is the management. This section surrounds all of the other sections of the model and is very useful in trying to determine root causes. In this case, the training sessions used by FedEx may have contributed to the accident. The Crew did not appear to have adequate training using the APLC. In addition, the Captain and the First Officer both suffered from a lack of knowledge concerning the regulation pertaining to landing distance. They thought that the landing distance was going to be longer than the one given by the APLC because one thrust reverser was inoperative. In reality, the deceleration effects of the thrust reversers are not taken into account in determining the landing distance. Furthermore, the crew selected MAX auto brake, which automatically sets the deceleration rate at a value corresponding to the best friction coefficient, not depending on the use of thrust reversers. The possible inadequacies in training and deficiency in the knowledge of important Federal Regulations significantly contributed to the accident.

The Reason’s Model applied to the FedEx Flight 14 Accident

The Reason Model is also known as the Swiss Cheese Model (Wells and Rodrigues, 2003). Each slice of the model represents a barrier that can prevent an accident from happening. However, each slice is depicted with holes in it to represent errors or deficiencies in that particular area. For an accident to occur, those holes must all line up, which is shown in Figure 4. The first barrier depicted with holes in it is that of the decisions-makers. As stated before, the crew suffered from a lack of knowledge regarding the regulation concerning the calculation of landing distance.

![Figure 4. The Reason Model (Wells & Rodrigues, 2003).](image)
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An important question to ask when using the Reasons Model is, what would have happened if FedEx or the Federal Aviation Administration (FAA) had required written proficiency tests concerning commonly used regulations? When looking at the handling characteristics of the aircraft, what would have happened if the regulation concerning the certification of airplanes had been reviewed in order to increase the requirements concerning the stability of pitch movements? If these questions were addressed and action was taken to adjust current regulations, perhaps this type of accident could be avoided in the future.

The next barrier is that of line management deficiencies, which pertains to the problems in the management of the company. It appeared that the crew suffered from insufficient training concerning landing techniques and the use of the APLC. The Captain of FedEx 14 did not adhere to the training proposed by FedEx, which shows a lack of training regarding adherence to standard operating procedures.

Preconditions is the term used to describe the next barrier that is shown in the Reason Model, which encompasses ignorance of the system and the acceptance of hazards. The Crew misinterpreted the information given by the APLC and that misinterpretation was partly induced by a lack of knowledge of the regulation concerning landing distance calculation. For this reason, the captain thought it was worth the risk to the safety of the flight to attempt to land prior to the typical touchdown point.

The fourth barrier, labeled unsafe acts, includes the use of wrong procedures and unsafe acts. The Captain wanted to touch down early, but did not adhere to any of the procedures set forth by FedEx regarding landing the MD-11. This led to the Pilot Induced Oscillations which finally led to the loss of control of the aircraft. In addition, the desire to touch down early altered the approach path of the aircraft and could have taken them outside of the object free area.

Finally, the last barrier to an accident is termed defenses, which has to do with things such as safety regulations not being enforced or over-reliance on automation. The NTSB recommended upgrading the FCC, which highlighted some deficiencies in its conception, but this was being done slowly to not interrupt the flight schedules. In addition, the First Officer should have noticed the Captain’s lack of control of the MD-11 and suggested a go-around.

**HUMAN PERFORMANCE IN FEDEX FLIGHT 14**

There are seven factors which can alter the performance of a crew (Wells and Rodrigues, 2003). The first factor that affects human performance is the physical factor, which includes things such as age, strength and the senses. The FedEx 14 captain suffered from sense and motor skill deficiencies, leading him to overreact and lose control of the aircraft. Physiological factors take into account things such as health and nutrition. Even though fatigue was not reported as a factor contributing to the accident, it is possible that the fatigue caused by a long flight could have factored into the misinterpretation of the information given by the APLC and knowledge of the regulation regarding that data. Psychological factors include the mental state and personality traits of the crew. This is important to consider because perhaps the captain thought he could land the aircraft without following procedures because he had done it before. This is known as normalization of deviance, a mentality of “it worked before, so it will work now”.

The psychosocial factors cover a wide range of effects, but most important in this case was anxiety and possibly their families. After a long flight, the will of landing as soon as possible may have urged the pilots to land even though the approach was not stabilized. In addition, the crew’s skills may have been affected by the stress caused by the misinterpreted landing distance. Hardware factored into the accident because of the APLC interface and the FCC that was not upgraded. The APLC interface may have been deficient, increasing the risk of misinterpretation of the data. Nature of the task is another factor that must be considered when studying the accident. The crew was focused on touching down early and the inoperative thrust reverser was gaining much of the captain’s attention. The captain reminded the first officer several times to only activate two thrust reversers. Finally, the environment may have contributed to the accident because it was nighttime when they landed at Newark. The darkness may have increased crew fatigue, which tends to decrease a crew’s ability to function properly and safely.

**SERVICE-LEARNING TO PREVENT SIMILAR ACCIDENTS**

As mentioned previously, the FedEx Flight 14 accident was due in part to the loss of control, more specifically the over-control of the aircraft, by the captain during landing. This incidence was neither the first, nor the last time such an action led to an accident. Aside from the statistics given at the beginning of this report, that idea can be confirmed by reviewing the database provided by the Air Safety Foundation (Peterson, 2006). The database provides information on similar accidents, which will be discussed below.

On December 21 1992, a Martinair DC-10 crashed at Faro, Portugal, killing 56 people. The instability of the approach was reported to be one of the contributing factors to the accident. One year later, in 1993, severe crosswinds in Dallas Fort Worth led to the destabilized approach of...
American Airlines Flight 102. When the First Officer advised the Captain he was going to execute a go-around, the Captain took control of the DC-10 and decided to continue the approach and landing. The Captain failed "to use proper directional control techniques to maintain the aircraft on the runway" and the aircraft departed the runway (NTSB, 1994). In 1999, during a major thunderstorm, 3 people were killed when an MD-11 crashed in Hong Kong. The final report stated that the Captain had failed to "arrest the high rate of descent existing at 50 ft Radio Altitude" (Civil Aviation Department Hong Kong, 2004).

In those three cases, and other similar ones, the reports state loss of control as one of the causes that contributed to the accident. However, "Loss of Control on Landing" can be considered an apparent cause and can only be prevented by trying to fix the root causes which lie behind it. Many times these accidents are due to a lack of knowledge concerning unstabilized approaches and the necessity of going around. As written by Bahl, Le Couteulx and Randel, "the attitude must change from 'we will land unless'..., to a mindset of, 'let's be prepared to go around, and only land if the approach is stabilized and we can continue safely to the runway'" (The Avion, 2006). Embry-Riddle Aeronautical University is an excellent place to start teaching pilots how to recognize an unstabilized approach and to stress the need to perform a go-around from unstabilized approaches. Increased awareness of what can lead to the loss of control on landing is, in fact, the best way to prevent similar accidents from occurring. An article, titled We Need to Change our Mindset, which is the source of the previous quote, was published in the Avion on November 14, 2006, by the authors of this JAAER article. Additionally, a safety seminar titled Keys to Stabilized Approaches and Safe Landings was also organized and presented on November 27, 2006, at Embry-Riddle Aeronautical University. A copy of the article from The Avion can be found in Appendix A. From those two safety actions, the key sentence to remember with regards to approach and landings could be: "Whenever you hesitate to go-around, go around!"

CONCLUSION

The FedEx Flight 14 accident resulted from an attempted landing following an unstable approach. The captain followed procedure and was flying a stabilized approach until an altitude of about 50 feet. After passing through this altitude, the captain controlled the aircraft in a way that led the aircraft into a pilot induced oscillation. Despite this, the crew did not execute a go-around, which is recommended by FedEx training and procedures for an unstable approach. To try to mitigate this type of accident in the future, it is important to look past the apparent cause, pilot error, and to divulge the root causes. Through the use of aviation safety tools such as the 5-M Model, the Reason Model, and the Seven Factors Affecting Human Performance, some of the possible root causes can be uncovered. The root causes included inadequacies in the training of the FedEx pilots, a deficiency of knowledge of pertinent regulations, which could tie into training, and the outdated Flight Control Computer that should have been updated prior to the accident.

As was discussed earlier, this type of accident is very common in general aviation as well, which is why it is important to recognize an unstable approach and do the only appropriate thing, GO-AROUND! Hopefully this analysis has inspired pilots to have the courage to recognize their mistakes and simply go-around for another approach when circumstances dictate.

Ed Randel is a recent graduate of Embry-Riddle Aeronautical University. He is currently a flight instructor in Daytona Beach, FL and hopes to fly for a Part 91 Charter operation or a Part 135 operation in the future.

Guillaume Le Couteulx was an exchange student from France studying at Embry-Riddle Aeronautical University for one semester and graduated from the Ecole Nationale de l'Aviation Civile in September 2007.

Jitesh Bahl is currently a junior at Embry Riddle Aeronautical University. He is working on his Commercial Pilot Certificate and hopes to fly for All Nippon Airways (ANA) in Japan after graduation.
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REFERENCES


We Need to Change Our Mindset

By: Ed Randel, Guillaume Le Couteulx, and Jitesh Bahl

As many of you know there has been an abrupt increase in landing incidents here at ERAU. It is very easy to blame the pilots involved so that we can put distance between ourselves and the incidents. The fact is, however, this can happen to any one of us if we aren’t careful.

The purpose of this article is not to teach you how to land or set up an approach, instead it will hopefully help you recognize an unstable approach and make you aware of the importance of going around immediately. It also bears mentioning that every accident is the result of a chain of errors. Human errors are common in any endeavor and sometimes are so small that they are seen as being insignificant. Other times, several of the seemingly insignificant errors occur simultaneously, stacking up on each other and producing an accident.

After talking with David Zwegers, Director of Aviation Safety here at ERAU, it was clear that all of the incidents were set up by an unstable approach. The flight department has taken steps to attempt to help avoid future incidents like the ones we have recently experienced. An all I.P. meeting was called to review the importance of teaching a safe and stabilized landing approach to their students. Despite this, it is important to remember that all students must accept the responsibility of ensuring a safe flight.

It is very easy to fall into the trap of trying to salvage an unstable approach during training because the instructor is there to tell us to go around if it gets too “bad”. This can lead to a pilot who will only go around at the last second or when the words “go around” are heard. Below are some tips to help you recognize an unstable approach.

It is recommended by the FAA Safety Foundation that an approach in visual meteorological condition (VMC) be stabilized by at least 500 feet AGL. A stabilized approach should include these following conditions: 1) the aircraft is on the correct flight path, 2) only minor adjustments in heading, pitch, and power are needed to maintain that flight path, 3) your airspeed is stabilized at approach speed +5/-0 knots, 4) the aircraft is in landing configuration, 5) the sink (descent) rate is stabilized at no more than 500 feet/min, and 6) all briefings and checklists are complete. These can be summarized by saying that the aircraft track, flight path angle, and the airspeed must all be in accordance with normal operating procedures. If any one of these are not met, an immediate go around should be executed.

Some very common situations that occur on unstable approaches include: flying the approach at idle because of excess speed or altitude, increasing power on short final to stretch the approach, or very steep approaches requiring a side slip well below a safe stabilization altitude.

Every day pilots ignore these signs hoping to salvage a landing and avoid the go around. Most of the time the pilot is able to salvage the approach and safely land the airplane, but you cannot allow this normalization of deviance to occur. The first time it happens you may only be 50 feet high, but after doing that a few times, 50 feet high becomes the standard approach height.

One example of an attempt to salvage an unstable approach happened just last month in Pensacola, FL. A student pilot, on his first solo, after one hour of landing practice with his instructor and one successful solo landing, impacted the trees at the departure end of the runway on his second solo landing attempt. The student was high on the approach and tried to salvage the approach. When the go around was initiated, it was too late. The pilot could not climb sufficiently, resulting in impacting the trees, but, luckily, damaging only the aircraft.

An accident such as this, as well as the recent incidents here at ERAU, must lead to a change in mindset among all pilots. The attitude must change from “we will land unless...” to a mindset of “let’s be prepared to go around, and only land if the approach is stabilized and we can continue safely to the runway”. This change in attitude will not only lead to a decrease in the number of incidents, but will also improve the quality of landings by all levels of pilots. Thank you for taking the time to read this article and please continue to fly safely in the future.