What's the difference between a go-around and a rejected landing?

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The recent storms in the U.K. made for some incredible viewing for spotters at airports across the country. The 90 mph winds battered aircraft as they made their approaches to land, the pilots requiring all their training and skills to keep their passengers and crew safe.

Whilst the majority of flights landed first time around, a number of crews decided that, at that exact moment, it would be safer to go back up into the air and have another go. Some of these go-arounds started hundreds of feet above the ground, others once over the airport boundary fence.

However, a select few crews decided to reject their landing once they had already touched down, applying full power and heading back up into the air.

Whilst the two manoeuvres may seem identical from the outside, from the pilots' perspective, it takes a serious mental shift and a change in actions to carry out the latter. So what exactly is a rejected landing and how does it differ from a go-around?

Recent storms caused many pilots to abandon their landing, some at the very last moment. (Photo by Francis Dean/Corbis/Getty Images)

From every accident comes progress

Up until the summer of 2006, there was little differentiation between the two procedures. However, the crash of a Boeing 777 at Dubai International Airport was to change everything.

Making an approach in changing wind conditions, the aircraft picked up a tailwind just before it touched down. This change caused the aircraft's ground speed to increase, pushing it further down the runway. When the pilots realised that they would not touchdown in the correct area, they decided to initiate a go-around.

However, this didn't go according to plan. As the aircraft began to climb away from the runway, the airspeed dropped and the aircraft fell out of the sky. Whilst everyone on board escaped the aircraft safely, sadly an airport firefighter lost his life in the resultant blaze.

So what caused the aircraft to crash, even though the pilots did as they thought they should?

Flare mode

As 777 and 787 aircraft get closer to the ground, at around 20 feet above the runway, the autothrottle system enters what's known as "flare mode". In anticipation of touching down, it slowly reduces the power to idle. The idea is that when the wheels meet the runway, the power is at idle, ready for the reverse thrust to be engaged.

However, what wasn't well understood at the time was that once flare mode had been activated, the normal procedure for a normal go-around would not work.

Read more: Windshear: Why pilots learn to respect the weather

As a 787 and 777 near the runway, the autothrottle enters “flare mode”. (Photo by Nicolas Economou/NurPhoto/Getty Images)

Go-around versus rejected landing

A go-around is when an aircraft discontinues its approach to land and climbs back up into the sky. A rejected landing is a specific go-around where the pilots decide to abandon the landing after the flare has been initiated.

They may both sound very similar, but the procedures for the pilots are quite different.

Go-around

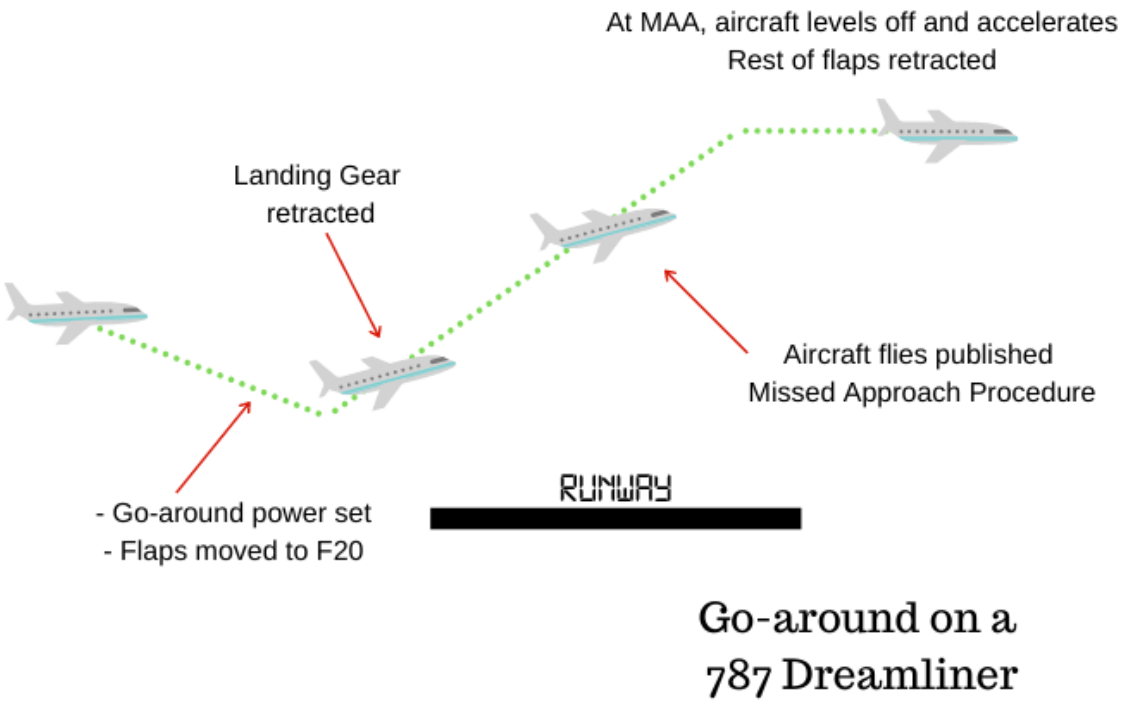
How it’s done

On the Boeing 787 Dreamliner which I fly, a go-around is commenced by pressing the TOGA (Take-Off/Go-Around) buttons on the front of the thrust levers. This instructs the autothrottle to command go-around power from the engines. It also tells the flight directors (the little crosshairs we follow on our screens) to command a nose up attitude.

At the same time, the Pilot Flying (PF) calls for the other pilot to retract the flaps to F20 position.

If the autopilot is engaged, the aircraft will pitch up to satisfy the demand. If the pilots are flying manually, they will pull back on the control column to follow the flight director instructions.

Full power is rarely used, resulting in a safe, but not excessive, climb rate of around 2,000 feet per minute. With positive confirmation from both pilots that the aircraft is climbing back up into the air, the gear is selected up.



The go-around procedure on the 777/787. (Image Charlie Page/The Points Guy)

When it's needed

When looking at what may cause a go-around, it's useful to consider what pilots are aiming to do in order to complete a safe landing. This includes touching the aircraft down within the touchdown zone on the runway, within the runway edges and at a safe speed. If any of these are in doubt, it's much safer for us to go-around.

If the wind across the runway is too strong, the aircraft may not touch down within the edges of the runway. Therefore, we go-around. If the aircraft is high on the approach, it may not touchdown in the touchdown zone. Therefore, we go-around. If the aircraft is too fast, there may not be enough runway to stop. Therefore, you guessed it, we go-around.

Low cloud and fog are also reasons for a go-around. Every approach has a published Decision Altitude (DA). When reaching this point, if we are not able to see the runway or the approach lights, we must go-around.

Other factors may also necessitate a go-around. If the previous landing aircraft is still on the runway, there could be a risk of colliding with them. Or, in the case of the video below, sometimes aircraft stray onto the landing runway. This is known as a runway incursion. Whilst quite rare, understandably, it requires the landing aircraft to go-around.

Read more: What are the strange noises and sensations you experience on a flight?

Watch Video At: https://youtu.be/1N5THRSp4hM

Rejected landing

How it's done

The main difference with a rejected landing is that it will occur much closer to the ground and the procedure must be done manually by the pilots.

When the pilots decide to reject a landing, they will most likely already be flying the aircraft manually. The only exception is in the case of an autoland in fog. On the thrust levers, the PF disconnects the autothrottle with the button under their thumb and aggressively applies maximum power.

If the aircraft has already touched down, the speed brakes will have automatically deployed. These are the large panels on the surface of the wing which dump any remaining lift, allowing the brakes to have maximum effect.

However, if the pilots want to climb back into the air, they'll need all the lift they can get. As a result, when the power is increased forward of a certain point, the speed brakes automatically retract.

At this point, the master warning alarm sounds in the flight deck, alerting the crew that a non-normal configuration is detected. However, the aircraft isn't smart enough to realise that this is exactly what the pilots want and just serves as a distraction which the crew must ignore.

There then exists a few seconds of nothing. As the engines were at idle, it can take several seconds for them to spool up to maximum power. Climbing away with no power could prove catastrophic. So, with the cockpit alarms begging for attention, the pilots must do exactly the opposite. Pause, and do nothing.

The autothrottle disconnect button on the side of the thrust lever. (Photo Charlie Page/The Points Guy)

In order to climb away from the ground, the aircraft needs lift. This is provided by airflow over the wings. As the engines power up, the airspeed starts to increase, generating more lift. However, the increased thrust also provides another factor the pilots must contend with.

As the engines sit in front of the leading edge of the wing, the increasing power creates a force that pitches the nose up. If this is not controlled, the aircraft could scrape the tail on the runway. As a result, the pilots may have to push forward on the control column to keep the aircraft under control.

When the speed has increased above the landing speed, the pilots know that they are now going fast enough to get airborne safely. The PF will relax the pressure on the control column and allow the aircraft to lift gently off the runway.

Once airborne, and happy that the tail will not hit the ground, the PF will pull back further on the stick, aiming for a nose up angle of around 15 degrees. This stops the aircraft from accelerating too quickly whilst climbing safely away from the ground.

At this point, the PF presses the TOGA button and resumes the normal go-around procedure.

Note that all this time, the landing gear and the flaps remain exactly as they were for landing. The priority is to apply maximum power and climb away from the ground before doing anything else. This is why the gear may remain down for much longer than you'd normally expect. The video below shows a great execution of a rejected landing — not a "touch and go'" as the commentator describes.

Watch Video At: https://youtu.be/TxrKoDGjNzY

When it's needed

By definition, a rejected landing will occur when the aircraft is almost on the ground, or even after it has touched down.

In order to ensure a safe stop before the end of the runway, pilots must land the main wheels within the touchdown zone. This is indicated by white markings on the runway. If it looks like they will or do actually land beyond this zone, they will perform a rejected landing.

This could be caused by any number of reasons, most commonly by a sudden increase in

the tailwind which pushes the aircraft beyond the touchdown zone.

A sudden gust of wind which destabilises the aircraft just before touch down could also be a reason to reject the landing. These are quite common on stormy days when the wind can change suddenly. The pilots will be aware of this probability and be expecting the need for a rejected landing.

It's not always environmental factors which will necessitate a rejected landing. International airports are busy places so there's always the chance that aircraft and vehicles could stray onto the runway ahead of a landing aircraft. The landing pilots will always be aware of this threat and be ready to reject the landing if necessary.

The manoeuvre can be executed anytime until the reverse thrust has been activated. At this point, the crew must commit to a full stop. This is why the PF will not engage the reverse thrust until they are happy that they can stop safely.

Published Missed Approach Procedure

As a go-around is a time of extremely high workload, every approach to a runway has a Published Missed Approach Procedure. This details the lateral track we must fly and also the vertical profile with which we must comply. This means that in the event of a go-around, ATC has already "told" us what they want us to do.

During the brief, we check that what is in the Flight Management Computer (FMC) is what is depicted on the approach chart. As the aircraft guidance system will follow what is in the FMC, any errors here must be picked up before we start the approach. This is normally done by one pilot reading the procedure from the chart and the other checking that the FMC reads the same.

Most importantly, this also includes the Missed Approach Altitude (MAA), the altitude which we must stop at to avoid conflicting with other traffic. With the Missed Approach Procedure complete, the crew can then make a decision whether to try and land again or if it would be better to divert to another airport.

Bottom line

The ability to abandon a landing at the very last moment requires clear thinking from the pilots. Deciding whether to execute the go-around procedure or the rejected landing procedure requires focus and skill. However, the stress of the situation can be reduced by talking about the required actions during the brief in the cruise. Whether it be a go-around from several hundred feet above the ground or a rejected landing having already touched down, the sole purpose is to ensure the safety of all those on board. It's much better to head back up into the sky and try again than to force a landing and veer off the runway.

Featured photo courtesy of Airbus.