Aviation Law

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What you always wanted to know about planes

This presentation was prepared
by Advantage Partnership Lawyers

CONTENTS	PAGE
Part 1 – The safest section in the plane	**2**
Part 2 – Delayed flights and what are you entitled to	**4**
Part 3 – Mobile phone and frequencies	**6**
Part 4 – How airplanes take off	**7**
Part 5 ─ Engine sizes and their particularities	**8**
Part 6 – Altitude and air pressure	**9**
Part 7 – Temperature and emergency landing	**11**
Part 8 – Airplane cockpit	**12**
Part 9 – Airplane tragedies	**14**

PART 1 - THE SAFEST SECTION IN THE PLANE

1. **Why do first class and business class passenger's board first? Is it because they pay more money?**

Nowadays, jet aircrafts have their centre of gravity (**COG**) at the front. The aircraft uses the front and main wheel to park or taxi and does not have a tail wheel. If the back seat passengers are boarded first, the front wheel of the aircraft may be lifted, possibly causing the tail to touch on the ground.

2. **Is there any survival chance if the aircraft has an issue in the air? Which part of the cabin is the safest - the front or the back?**

First class and business class are located towards the front of the aircraft. Usually an air crash results in the aircraft hitting the ground or the water with head or front impact first. Therefore, passengers towards the back have a higher probability of surviving.

3. **Why is it that passengers who have paid more money for first class or business class are not seated in the safer seating area**?

   Airlines give the first class and business class passengers first in boarding and first out disembarking. Also, as the COG is located towards the front of the aircraft, first class and business class passengers are provided with the most comfort due to lower levels of vibrations, therefore keeping the high paying passengers most comfortable. During World War II, most aircrafts used the main wheel and tail wheel to park or taxi, with the COG located at the rear. Therefore, the high paying passengers may be allocated to a different seat.

4. **What can you do in the situation of an air crash as a passenger?**

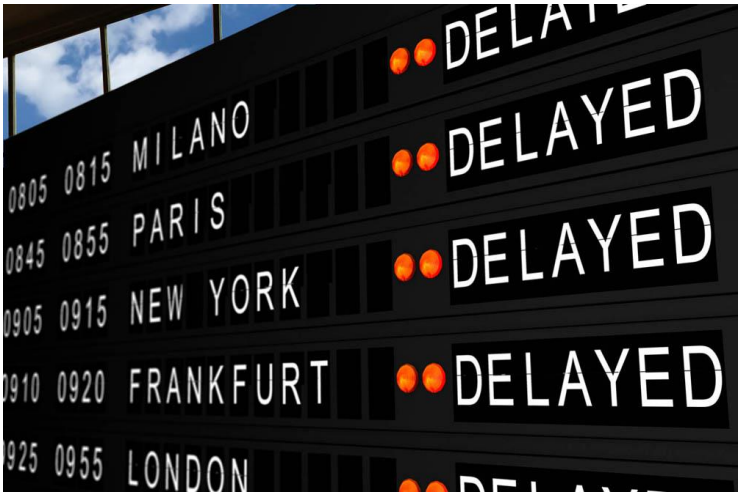
I recommend that you take with you a jacket or coat when you are boarding the aircraft. Once the aircraft crashes into the ground or if there is damage to the aircraft mid-air, luggage stored above you, as well as other plastic panels and various parts within the cabin, may uncontrollably fly around possibly colliding with your head or body. You need to cover your head and face with the blanket or jacket to best avoid this from happening.

5. **Why do you get intoxicated more easily in the air?**

When an aircraft steadily increases in altitude, the air pressure steadily decreases. During long flights, such as a ten hour flight from Australia to Japan, an aircraft usually flies at 40 000 feet or 13,000 meters above sea level. In the cabin, pressure of an altitude of up to 6000 feet or 2 000 meters above sea level is regulated by an air compressor. This is equivalent to two times (2x) the height of Katoomba, located in the Blue Mountains, Sydney. Therefore, due to the decrease in air pressure at high altitudes, you easily get intoxicated more easily in the air.

The air crew members are prohibited from drinking eight (8) hours before a flight under the law. Please do not ask the air crew to drink with you.

PART 2 - DELAYED FLIGHTS AND WHAT ARE YOU ENTITLED TO



Have you ever been annoyed when your flight schedule has been delayed, sometimes for up to a day? Have you ever been in a situation where you have missed a very important business deal because your flight was delayed? Do you think you are entitled to be compensated for your losses on missing important events? Under aviation law, you are not entitled at all, unless your flight has already departed.

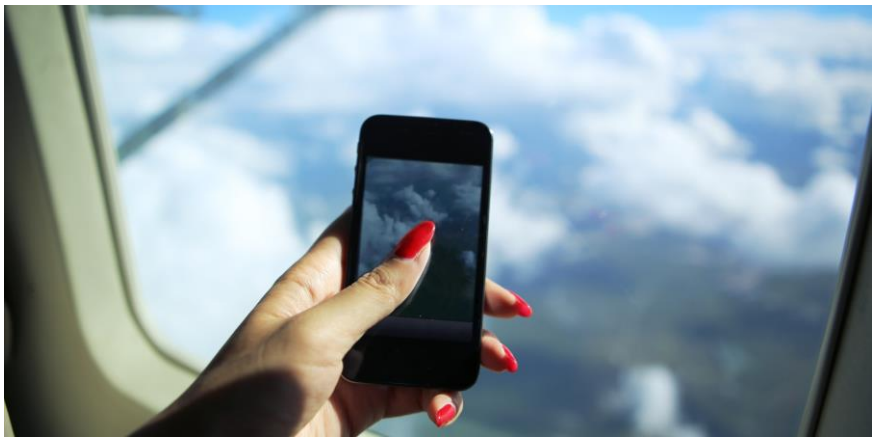
For instance, if you have a flight from Sydney to Los Angeles or Tokyo and the flight has been delayed due to bad weather, if you have already boarded the aircraft and the aircraft has left Sydney, then the result is that the airline is responsible for the delay. Remember though, even if a delay in your flight causes you to miss an important business meeting, due to a delay occurring after the aircraft has already departed, the airline will only compensate for extended hotel accommodation or similar. The airline may not compensate for loss of business chance, unless airline could foretell such a loss before you bought your ticket.

Under aviation law, the usual reasons why flights are delayed involve the minimum decision altitude (**MDA**) test in respect to landing an aircraft. The MDA involves a specified altitude, below which descent must not be made without the required visual reference. For example, the MDA at Sydney airport is about 200 feet and unless the pilot can see with the naked eye the other end of the runway, the pilot is not legally allowed to land the aircraft. What will happen if this is the case? The pilot has to give up landing the aircraft at that time. This means the airplane has to join the waiting queue or the pilot has to depart Sydney airport and fly to an alternative airport for more friendly weather. For instance, when it is marginal for the pilot to land, the pilot must give details of the alternative airport to the Civil Aviation Service of Australia (**CASA**).

Other reasons for delay are accounted for under the new regulation of the civil aviation law. For instance, if a passenger does not board the aircraft after having checked in luggage, the aircraft is not legally allowed to leave the airport due to risk of terrorism.

It is important for you as a passenger to check the schedule of the airline before leaving your home or hotel, to determine if there is going to be a delay on your flight.

PART 3 - MOBILE PHONE AND FREQUENCIES



Why do airlines disallow the use of mobile phones and similar electronic items such as computers in-flight?

In many cases, airlines will prohibit the use of such items during take-off and landing as well as in-flight, with pre-warning announced. There are two types of instrument flight, identified as ‘visual flight’ and ‘instrument flight’.

Visual flight corresponds to flight with the naked eye of the pilot, whereas instrument flight corresponds to the pilot relying on an instrument to fly the aircraft. Instrument flight includes use of a global positioning system (**GPS**) and VHF omni range/distance measuring equipment (**VOR/DME**), which is the combined radio navigation station for an aircraft. A non-directional beacon (**NDB**) which acts as a radio transmitter at a known location is also used, as is an instrument landing system (ILS) which is a radio beam transmitter that provides a direction for approaching aircraft to tune their receiver to the ILS frequency. Unauthorised use of an electronic instrument, such as a mobile phone or computer may possibility affect the instruments in use by the aircraft in flight.

PART 4 – HOW AIRPLANES TAKE OFF?

Why would an aircraft take off from the other side of the airport or the terminal furthest from the terminal?

An aircraft will always take off against a headwind as this will increase the buoyancy of the airplane. Problems will occur if an aircraft takes off in a tail wind and is considered to be a major safety risk. Once the pilot receives permission to take-off from the control center, the throttle will be lifted and the plane will accelerate. V-speeds are standard terms used to define air speeds important or useful in the operation of all aircraft.

The first important speed is V1, which is the critical engine failure recognition speed or take-off decision speed. It is the decision speed nominated by the pilot which satisfies all safety rules, and above which the take-off will continue even if an engine fails. If velocity exceeds the V1, take-off will not be interrupted and must occur. The reason for this is because the limited distance of the runway will not be enough to bring the plane to a stop due to the brakes past the V1.

The next important velocity is V2 which corresponds to the velocity to start the take-off. When you take off before V2, there is a possibility that it will lead to not enough velocity which will cause the aircraft to stall, causing a large accident. There is increased resistance when the aircraft begins to take-off from the point beyond the V2, with the aircraft likely to gain movement on the runway. Speed as the next index, is velocity of minimum control airspeed (**VMCA**). VMCA is the minimum air speed in order to safely maneuver the aircraft. When you exceed this technique, the pilot will retract the wheels. The reason for storing the wheels is that it will reduce the air resistance of friction and will further increase the air speed of the aircraft. Following this, the pilot will begin storage of the flap. This will raise the air speed as the resistance of the flap will no longer occur. When you forget to retract the flaps, trouble will occur in flight as this raises the air resistance. The flap is used even at low speed to increase the resistance of the aircraft to encourage altitude. Cabin signs indicating use of seat belts in-flight will disappear and it is at this time when the aircrew will begin to prepare drinks and meals.

PART 5 - ENGINE SIZES AND THEIR PARTICULARITIES

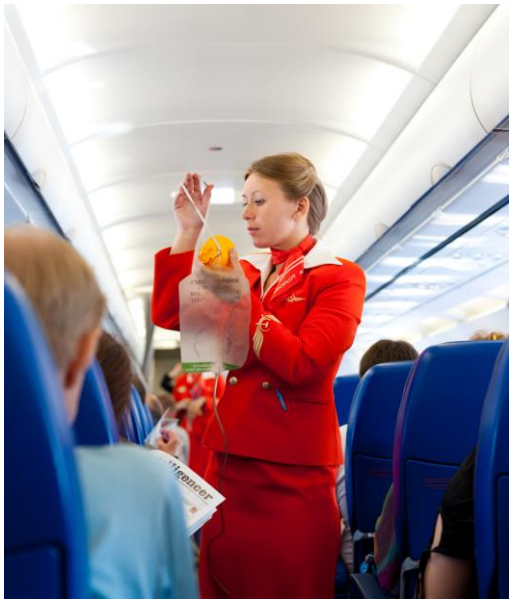
A medium sized passenger aircraft accident involving a twin engine propeller plane occurred in Taiwan, which resulted in many of the passengers dying. According to reports, the accident was a result of an engine stoppage that occurred after take-off, whereby the pilot mistakenly disengaged the second engine, causing the aircraft to stall, fall and crash into the river.

As a result of the increase in flight performance technology, most modern aircrafts are designed to fly using twin engines, as opposed to older aircrafts that flew with three (3), if not (4) engines. However, as the crash into the Hudson River, United States shows, accidents occurring shortly after take-off are still quite common. The cause may be a result of an external factor, as was the case in the Hudson River incident, whereby the aircraft struck a flock of Canadian geese ultimately causing engine failure, or as the result of an internal mechanical factor, such as mixing fuel with water.

The Velocity of Minimum Control Airspeed (**VMCA**), not to be confused with YMCA, is approached, the aircraft will be impossible to manoeuver. If a twin engine aircraft was to take off and subsequently have one engine stop, the pilot would need to pitch the propeller to increase power and feather the dead engine's propeller; otherwise the aircraft will not succeed the VMCA and will stall.

When the propulsion of the aircraft is reduced due to an engine failure, there is a need to reduce and minimise the air resistance of the propeller corresponding to the stopped engine. The aircraft will only fly on the driving force of the working engine, which will cause the aircraft to become asymmetric. In order to recover an aircraft that is experiencing this asymmetry, the pilot must tilt the aircraft in the opposite direction of the stopped engine by adjusting the vertical rudder, otherwise the imbalance will cause the aircraft to rotate.

PART 6 – ALTITUDE AND AIR PRESSURE



Passenger aircrafts are equipped with air compressors that allow the aircraft to fly between 25,000 and 45,000 feet (15,000 meters) from (8,000 meters). Previously the aircraft could not fly at an altitude higher than 10,000 feet (3,000 meters) as they were not equipped with air compressors. The maximum an aircraft can fly without a compressor is a legal altitude of 10,000 feet. However, practically, as long as it is a short time, an aircraft may rise up to 14,000 feet (4,500 meters).

1. Why certain altitudes are legally prohibited?

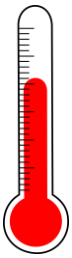
When an aircraft reaches a certain height (above 10,000 feet), passengers will find it difficult to breathe, this is because when you exceed 10,000 feet, the air becomes thinner, and there is less oxygen. The chance of death increases.

2. Why do current aircrafts rise to such a dangerous altitude?

When the aircraft is close to the ground, there is greater turbulence. When the aircraft flies higher the airflow becomes stable and the aircraft is able to fly smoothly. However, the higher an aircraft flies there is a greater chance that passengers will suffer when the air compressor fails. Therefore, oxygen masks must be installed on the aircraft above the passenger seats. This ensures should the compressor fail during the flight, the air masks will automatically drop down and provide oxygen for at least 10 minutes. When the oxygen masks fall down the pilot has 10 minutes, to lower the altitude, otherwise the oxygen will run out and death is imminent.

Compressors are powered by electricity and electricity is generated by the engine. If the engine stops, the compressor stops simultaneously. Current aircrafts now have a standby generator that does not depend on the engine. If the engine stops the standby generator automatically starts to run. The generator is located around the rudder area.

PART 7 – TEMPERATURE AND EMERGENCY LANDNG



Outside air temperature will drop about 6 degrees per 1,000 meters when the aircraft increases in altitude. The aircraft reaches a level flight between 8,000 and 15,000 meters. The outside temperature will be 48 to 90 degrees lower than the surface temperature.

In order to maintain the room temperature in the cabin, the cabins will intake hot air from the engine of the aircraft. However, there is a need to increase the pressure in the air compressor before distributing through the cabin. The air must be compressed by the air compressor. The humidity is increased, thus you need to dehumidify the air before it is discharged.

When the engine stops, the cabin temperature will gradually decrease. Most aircrafts have twin engines. If one engine stops, the aircraft can safely fly until the air craft can reach the nearest airfield. However, if all engines stop, the safe landing cannot be guaranteed.

Pilot will attempt to re-start the engine. If neither engine starts the pilot has no choice but to make an emergency landing in an unpopulated place, if there is no airfield near.

Even if an airfield is there, landing is not easy. A plane is a large glider with a large number of passengers. The Boeing 777 glides approximately, 300km per hour. An aircraft will aim for the nearest airfield, but because there is no engine to restart failure is not an option. It is critical to judge the altitude and distance to the airfield. Even if the pilot can see the airfield, the pilot is not at ease yet. They will need to worry about the aircraft not landing if there is not enough altitude or if there is too much and whether there is too much speed or not enough.

If there is an engine the pilot may attempt to the land again by going around again. However, if no engine is working the pilot only has one chance to land.

Part 8 - AIRPLANE COCKPIT

Have you ever sat in the cockpit of an aircraft?

Except in an airbus, most aircrafts have a column in the centre of the cockpit. The pilot does not use the column on the ground. The current aircraft have a control panel; however old aircrafts have an individual instrument around the column.

The most important instrument is the Attitude Indicator (**AI**). The AI indicates the altitude of an aircraft. In the clouds and at night time, the pilot cannot see the scenery. The pilot instead relies on the AI to fly the aircraft. The most important thing to do with the AI is to keep the aircraft level.

The Vertical Speed Indicator (**VSI**) indicates the vertical speed of the aircraft when it climbs or descends. Pilots can tell whether the aircraft is ascending or descending in altitude. The pilot will check the VSI immediately, after the aircraft lifts off to ensure the aircraft is climbing.

Direction Indicator (**DI**) is the instrument that indicates the direction in which the aircraft is flying. Most aircrafts have a DI linked to a compass.

The AI, VSI and DI are the three most paramount instruments. If one of the instruments is out of order, then under Australian Law the aircraft is not fit to fly.

If the DI is linked to the compass it does not mean the aircraft is flying in the correct direction. Reason being, in the air there is strong wind high in the sky. The pilot must work out the strength of the wind and the direction of the wind, and then decide where the aircraft is heading.

We now have Global Positioning Systems (**GPS**). However, we didn't have GPS previously. Pilots relied on communication systems on ground called VOR and NDB, which could ascertain the aircrafts position. However these communication

systems on the ground have limitations, which is distance. Particularly when used on small airfields, they are not reliable.

PART 9 - AIRPLANE TRAGEDIES

It has been a couple of years now since the Malaysia Airlines aeroplane disappeared from the radar.

The fact is the plane may have fallen into the mountains or the sea. However, it does not necessarily mean that the airplane was destroyed. Do you remember the 911 of New York? The hijacked aeroplane controlled by the terrorists disappeared from the radar while the aeroplane was flying. The relationship between planes and radar is the communication. All aeroplanes have been equipped with a transmitter called a transponder. The pilot is able to use the transponder by entering a four-digit combination number. The number is displayed on the radar. However, if the power is cut off to the transponder, the number will disappear.

In the case of passenger aircraft, in the airfield before take-off the pilot will receive a four-digit number from air traffic control and typing that number. They will enter the four digit number and then turn on the transponder. Air traffic control is able to recognise any airplane flying in their jurisdiction based on the transponder number. However, the ability of the radar is not infinite; the detection distance from the radar base is limited. Thus, if the aeroplane exceeds the limit of the radar it will be lost.

The disappearance of the aeroplane from Malaysia Airlines radar may be considered three ways:

1. The aeroplane fell into the mountains and/or the sea; or
2. The aeroplanes transponder was turned off; or
3. The aeroplane exceeded the limit of the radar.

It is also possible; the aeroplane was forced to land somewhere in a country and was hijacked like the 911. However, if the passengers are alive, it is a wonder why we have not heard from anyone since.