



The gravity order and its effect on losing awareness and death threshold of experiments

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ABSTRACT

In this article, we have discussed the effect of changes in acceleration of gravity on the amount of human awareness. The concentration of research is on the outcomes of the brain which effectuates the loss of consciousness when the acceleration of gravity is changed (G-LOC). G-LOC, pronounced 'GEE-lock', is the abbreviation of G-force induced Loss Of Consciousness, a term generally used in aerospace physiology to describe a loss of consciousness occurring from excessive and sustained g-forces draining blood away from the brain causing cerebral hypoxia. The condition is most likely to affect pilots of high performance fighter and aerobatic aircraft or astronauts but is possible on some extreme amusement park rides. G-LOC incidents have caused fatal accidents in high performance aircraft capable of sustaining high g for extended periods. High-G training for pilots of high performance aircraft or spacecraft often includes ground training for G-LOC in special centrifuges, with some profiles exposing pilots to 9 gs for a sustained period. Experiments carried out on people all in good condition, revealed that they underwent different sufferings, both physically and mentally, when exposed to accelerated movements.

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Introduction

Do you know that the human is worried and have a feeling of heaviness in movements that become accelerated gradually, and becomes comatose and goes to death threshold if stays in these conditions? Also it's not possible to design passenger's planes for gaining to high speeds. The scientific survey which is ahead of you, have tried to check the effects of changes in acceleration of gravity on the amount of humans awareness. Concentration of research is on the outcomes of the brain which effectuates the loss of consciousness when the acceleration of gravity is changed (G-LOC). Experiments carried out on people all in good condition, revealed that they underwent different sufferings, both physically and mentally, when exposed to accelerated movements, also has been tried to point out the kinds of near death experiences in different gravity forces conditions by mentioning various examples about getting to high accelerations in missile sled, fighter planes, aerial & entertainment trains, and also pecking of woodpecker.

The gravity force and its effect on the level of awareness

The scientific methods need to tools that can analyze them in different experimental conditions and register them with real phenomena. In a time not so long ago, some people believed that the near death experiences are just fanciful images and the essence of them is not something over of imagination. The researches carried out on pilots who have flown with accelerations which is manifold of acceleration of gravity, showed that they have lost their consciousness under different conditions of gravity forces and got to the near death experiences. The jets fighter pilots are always worry about sharp twists in their movement. In these movements, while the body of the pilot is getting to centralized acceleration, and the head of the pilot is accelerating towards the center curvature of the route, the blood pressure reduces in the brain, so the brain falls out.

Dr Jame, E. Winney, the chemistry professor of scientific institute (West Texas, A&M) did some researches that the topic of that was about battling between pilots and maximum gravity forces in maximum conditions and in one great centrifuge. Experiments showed surprisingly that pilots lose their consciousness under various conditions of gravity acceleration. We know that the gravitational force is one of the basic forces in nature, that exists between two masses and each mass with ground that causes making gravity acceleration near the ground and is exerted to its nearby objects inherently, and attract them to its side and the experimental average size of that is 9.8m/s^2 or 35.3km/h and its context is that the object's speed is increased in an amount of 9.8m/s per second to be fixed and get to the amount of limitation speed in certain conditions.

On September 26, 1993, while David Mundy had gone to the metallic ball with some holes, jumped from the edge of Niagara Falls and after 3.1s and traversing 48 meters in height, fell into the water. While his speed had gotten to 110km/h , he didn't have any awareness about increasing speed during the fall. Because his acceleration was always fixed during the free-fall, but he had awareness completely about his hitting with the water surface, and it was because of changing of his high speed and reducer acceleration. Mundy survived from this free-fall but he was fined for his fearless work.

The pressure is caused by gravity acceleration is one of the ruling conditions in flight of aircraft pilots, that expose them in G-LOC syndrome. Analyzing (G-LOC) of some pilots all in good conditions and with an average age of 32 years, had some scientific results that was recorded on some softwares. Results of these experiments are as follows:

When the measure of acceleration of moving is about 2 to 3 times more than acceleration of gravity ($2g$ to $3g$), the speed of blood flow reduce in arteries and capillaries and the pilot feels heaviness, about acceleration of $4g$, the velocity of blood flow

decrease more and less blood reaches to the brain, so sees the objects black and white and some blood clots in his stomach. With the movement acceleration of more than 4g, pilot vision is impaired, the flow of blood reduces intensely and the time of reaching blood to the central nervous system is slower and the phenomenon of losing consciousness is governing on the pilot (full anesthesia). so we can classify the events of G-LOC.

Experience of G-LOC has clinical complications such as:

lack of vision (video tunnel in anesthesia), seizure, paralysis of body (dissociation of tissues and capillaries), incomplete infarction, anesthesia, and the psychological complications might appear in some conditions that it will like dream tunnel (observing the shining light), flotation, apathy, spree and feeling of happiness, change of mental state, hugging the family and friends, access to the former memory (mental conflict), delirium, insist on understanding more.

The explanation of G-LOC phenomenon

For learning more about phenomenon of G-LOC, notice to the example of two-dimensional movement as following.

A fighter pilot enters to the flight twist (on the horizontal circle) with the initial speed of $V_i = 400i + 500j$ m/s and after 24.0s exits with the final speed of $V_f = -400i - 500j$ m/s from that.

How much is the plane acceleration in terms of g?

Solution: Assuming that, orbiting in this twist is a uniform circular motion, in this case, because of changing in the direction of the velocity vector, the pilot's acceleration will be centralized and its size calculate from following relation which R is the radius of the circular route.

$$a = \frac{V^2}{R}$$

Also the necessary time for performing a complete cycle, calculate from the relation Of $T = \frac{2\pi R}{V}$

In this case, we have:

$$a = \frac{V^2}{R} = \frac{V \times V}{R} = \frac{\frac{2\pi R}{T} \times V}{R} = \frac{2\pi}{T} \times V$$

Where V is the amount of velocity in orbiting the twist.

With placing the components of initial velocity in following relation, we will have:

$$V = \sqrt{V_x^2 + V_y^2} = \sqrt{(400^2) + (500^2)} = 640.31 \frac{m}{s}$$

For determining the orbital period of the motion, according to this, that final velocity is reverse of initial velocity. It means that the plane is exited from the front side on circle of the route, than first point.

On the other hand, it must cover the half of the circle in 24.0s. so it could cover the whole circle of the route in 48.0s.

With substituting the amounts of equation of acceleration, we have:

$$a = \frac{2 \times 3.14 \times 640.31 \frac{m}{s}}{48.0s} = 83.81 \frac{m}{s^2} = 8.6g$$

The obtainable value for plane acceleration is exerted on the pilot, because of G-LOC and makes him to be in death threshold.

In another example we can mention the motion of the entertainment trains in parks.

If the designer engineers of these trains, increase the speed of train in different routes, for making more excitement for passengers, the acceleration of train's passengers might increase about G-LOC and makes some serious problems for passengers.

Also, it's not possible to design passenger planes for gaining to high speeds. because in terms of the effect of gravity acceleration on passengers it will have serious risks for passengers of these planes, specially for pregnant women and kids.

A another examples in explanation of G-LOC phenomenon.

In another example, colonel John Stapp has been shown during accelerating and getting to high speeds in a sled equipped by missile.

This sled has been equipped by a missile to mobilizing that with extraordinary acceleration. High accelerations are usually expressed in terms of g unit. This acceleration has been measured about 22g that during the accelerating and increasing the speed, direction of acceleration is facing outward and toward the reader and during stopping intensely, that is facing to inside of page. When we board on a train in an amusement park might feel acceleration about 3g (almost 29m/s²) for some moments. This acceleration is certainly in part that justifies the cost of boarding the train. Of course it should be noted to this point that the human body reacts to the acceleration (like accelerometer) but it doesn't react to the speed. (it means that's not speedometer).

When we are in plane that is moving with a speed of 900km/h, we don't have physical awareness to our motion, but if the plane suddenly changes its speed, we feel this changing of speed immediately. Part of the excitement of trains in amusement parks is because of changing the speed suddenly. (in fact, we spend money for acceleration, not for speed). so the designer engineers of these trains increase the speed of train in different routes and of course with particular amounts for making more excitement for the passengers, because the acceleration of train's passengers might increase about G-LOC and causes some serious problems for them.

Many devotees of aerial trains prefer to board on first wagon, because they enjoy to be first people that experience risk and slope from a dip. But there are many devotees that prefer the last wagon. According to their claims, the passing of high-risk in hind wagon is more scary. Surely, when the last wagon gets to the edge of the precipice, the aerial train has more speed but it seems that there is an another subtle factor here that causes more scary at the last wagon in the edge of the precipice.

The reality is that generally if more number of the wagons slope from the edge of horizontal platform and perch on the dip, the acceleration of their motion is increased. This increase of acceleration doesn't have any relationship to the wagon that the passengers choose, but the interpretation that the passengers have from this acceleration is depend on a wagon that they choose.

At the first wagon, most of the acceleration occurs on an Inclined surface that is because of the weight force component along the inclined surface that the conclusion seems reasonable. Most of the acceleration in last wagon occurs on horizontal platform and it's because of the pressure that passengers feel from their seat's cushion.

This acceleration increase immediately by approaching to the edge of the platform, and makes this sense of horror for passengers that they are shooting from the platform to the air, so increasing too much speed in this trains is not possible [1].

Also it's not possible to design racing cars for rally, passenger's palms. And warplanes for taking off from the deck of the ship, on an airstrip with short length, for getting to high speeds, because in terms of the effect of gravity acceleration on passengers, it will have serious risks for passengers of these planes and cars, specially for pregnant women and kids.

The results of the experiments show that the speed of woodpecker is about 7.49m/s when the tip of its deack is hitting to the trunk. The deak of the woodpecker stops after percolating about 1.87mm in the trunk. Assuming to constant acceleration, this acceleration is given by:

$$a = \frac{v^2 - v_0^2}{2\Delta x} = \frac{0^2 - (7.49)^2}{2 \times 1.87 \times 10^{-3}} = -1.53 \times 10^4 \frac{m}{s^2}$$

The amount of acceleration of woodpecker's head is $a=1.53 \times 10^3 g$. This means 1530 times more than g, or 70 times of the acceleration of colonel Stapp in a sled equipped by missile. We should know this extra acceleration mortal for woodpecker. The reason of the woodpecker's tolerance for such a large acceleration hasn't been understood yet very well, but we discuss two important reasons in this case:

First, the woodpecker's head is almost along the straight line. Some people believe that the concussion in human and animal occurs when the head is rotating around its neck rapidly, but the possibility of such a this damage in the motion of a straight line is less.

The second reason is that the woodpecker's brain connectivity with its skull, is good and strong that after hitting the brain, it won't have any extra or oscillation motion, so there is not possibility for rupturing tissues of skull and brain connectivity.

Conclusion:

For reducing the effect of high gravity acceleration on body, we must use clothes special for astronavigation that are not affordable in the mentioned cases in terms of usage and cost, so we must avoid the high speed in entertainment trains and passenger planes.

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