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MAGLEV TRAINS: Trains that Fly

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High speed trains like MAGLEV TRAINS moves very smoothly as compared to the other conventional trains due to absence of wheels in it.

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MAGLEV TRAINS: Trains that Fly

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I. Introduction

Some forces in this world are almost invisible to the naked eye and most people throughout the world do not even know they exist. Magnetic field is one of the invisible forces present in this world which have a tremendous power hidden in it which can only one can feel. It is due to the power of the magnetism of the earth that the world spins and thus creates things like gravity.

The word MAGLEV which is derived from magnet & levitation uses magnetic force to levitate the trains and propel the train with the help of it. In it the train coaches are levitated (to hold aloft) from the tracks or guide ways using the magnetic force generated which creates a thrust and lift.

MAGLEV TRAIN uses this powerful magnetic field power to propel the vehicle in a more powerful and uses energy in a proper way. The vehicle propelled using magnetic levitation technology moves more smoothly than the wheeled conventional means of transportation. Due to the absence of the wheels there is a no problem of friction that we see in a conventional wheeled train. It even does not use much of energy as most of the energy which is required is used to overcome the air drag or we can say resistance which is caused due to the air. The conventional trains are faster but maglev trains are much faster than conventional train, due to this speed maglev trains hold a speed record for any type of rail transportation. There are many advantages of MAGLEV TRAINS over conventional trains which are as follows:

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- Since train is lifted above the tracks so there is no friction so these trains easily move at a higher speed.
- The system is very safe and eco friendly.
- No risk of fire as there is any fuel required in it.
- The train speed is much higher than the normal conventional trains.
- A very little amount of electricity is required in it only to portion of the track which is to be used.

II. Working Principle

MAGLEV TRAIN uses the electromagnetic force which is generally created between the magnets mounted on the bottom of the vehicle and the coils which are attached to the ground or guide way over which the trains move. The following will explain the basic working principle over which these trains work:

a) Levitation

Support electromagnets built into the chassis and pull along the entire length of the train to the guide way solenoid, which is called the ferromagnetic reaction rails. Placed on each side of the guidance magnet train along the track center and to keep it guided along the train. All the electromagnet electronic control in a precise manner. It ensures that the train is always from even when it is not moving guide way distance of 8-10 mm suspension. This suspension system is a vehicle-mounted battery, they consist of linear generator, when a train traveling charging power supply. The generator is integrated in the suspension by the electromagnet coil extra cable. Inductive current generator driven during use of the propulsion magnetic field harmonic, which is due to the long-term side effects such charging process of the stator groove, is not useful to promote consumption of the magnetic field. The train can rely on this battery power for up to one hour without the need for an external power supply. Suspension system is independent of the propulsion system.

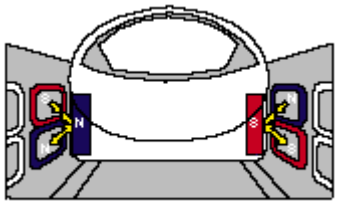

Figure 1: Levitation

b) Propulsion

Maglev System synchronous long stator linear motor propulsion and brake simultaneously. It operates as a normal rotation of the motor, the stator is cut and stretched along the lower guide way. Internal motor winding, alternating current generation without contacting the traveling magnetic field on a moving vehicle. In the vehicle function as an incentive portion (rotor) of the support.

In boot mode propulsion system is activated only in the actual operation of some of the vehicles. The speed can be continuously adjusted by varying the frequency of the alternating current. If the line of approach direction is reversed, the electric motor becomes a generator; it destroyed the vehicle without any contact. Braking energy can be re-used, and fed back into the grid. Three-phase stator winding generating an electromagnetic traveling field and exchange it with a moving train when the current supply. Support from the electromagnet electromagnetic field (rotor) to pull it together. Direction and speed of the magnetic field of the stator and rotor are synchronized. Maglev rotational speed from standstill to full speed by simply adjusting the frequency of the alternating current variation. In order to completely stop the train, traveling direction of the magnetic field is reversed. Even during braking, without any mechanical contact between the stator and rotor. Instead of energy, the magnetic levitation system as a generator, fracture energy is converted into electricity, which can be used elsewhere.

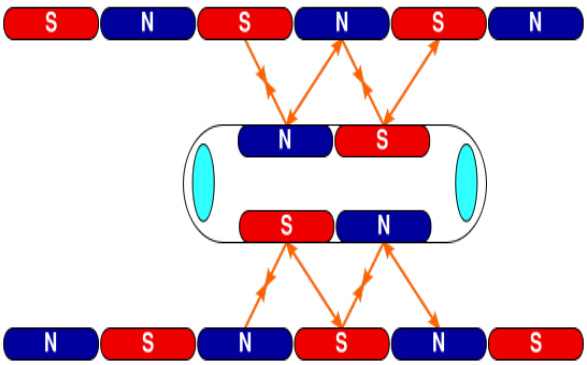

Figure 2: Propulsion

c) Stability

For all the success of the suspension and controls 6 axes (degrees of freedom; three translational and three rotational) permanent magnets and electromagnets or diamagnets superconductor or a combination of attraction and repulsion, and fields can be used. From Theorem Hawthorn won at least one stable axis must be present for the system to successfully float, but you can use other ferromagnetic stable axis. Static stability means that any small displacement from a stable equilibrium departure results in a net force pushing it back into balance. Hawthorn won Theorem confirmed, it is not possible to use stable suspension only static, macroscopic, along fields. Force on any combination of gravity, electrostatic and magnetic static fields acting on the paramagnetic object will make the position of the object, at best, erratic along at least one axis, and it may be unstable along all axes balance. However, several possibilities exist, and the suspension possible, for example, using an electronic stability or diamagnetic material (as a relative magnetic permeability less than one); it can be shown that the diamagnetic material is stable along at least one axis, and along All axis stabilization. Conductor may have a relative permeability of alternating magnetic field below, so some configurations using a simple AC driven electromagnet is self-stabilizing. Suspension system to damp any vibration-like motion that may occur dynamic stability.

Magnetic field is a conservative force, and therefore there is no built-in damping in principle and in practice many of the suspended program is under damped, in some cases, negative damping. This may allow for the presence of vibration modes may cause the program to leave the stable region.

Figure 3: Stability

d) Guidance

The electronic control located on both sides along the entire length of the vehicle pull the vehicle side of the stator ferromagnetic installation guide way package supports magnet. Located in the guidance magnet holding the transverse rail vehicles along the entire length of the sides of the vehicle. Electronic systems ensure the gap remains constant (nominally 10 mm). Hover, maglev requires less power than air-conditioning equipment. Suspension system from the car batteries, so they are independent of the propulsion system. The vehicle can hover up to an hour without external energy. On the road, the car battery is integrated into the support by the magnet linear generator charging.

Maglev hover track rail. It can be installed at grade or elevated slender columns up to 62 meters in length by the individual steel or concrete beams. Guiding or steering refers to the need to follow the vehicle lateral force rails. The force necessary to

complete a similar manner to the suspension force, whether attractive or rejection. The same vehicle magnet board, which provides lift, can guide or a separate guidance magnet can be used simultaneously. They use Null Flux systems, also known as zero-current system, wound so used, so that it enters two opposing, AC coil Variant Field. When the vehicle is straight field position, no current flows, but if it moves offline this creates a change in magnetic flux, which generates push it back into line.

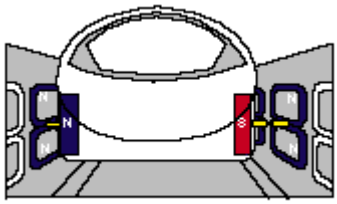

Figure 4: Guidance

III. Merits

Foremost advantage of maglev train is that it has no moving parts such as conventional trains do so, wear parts is minimal, and reduces a significant degree by the maintenance costs. More importantly, between the train and the track without physical contact, so there is no rolling resistance. Although the electromagnetic air resistance and friction do exist, but that does not hinder their ability to clock speeds of over 200 mph. Absence wheel also comes as a blessing, because you do not have to deal with a deafening noise is likely to be environmentally friendly Maglev's also have with them, because they do not resort to the internal combustion engine. These trains weathering resistance, which means rain, snow, or cold, do not really interfere with their performance. Experts believe that these trains a lot safer than their conventional, because they are equipped with advanced equipment, the most advanced security system that can keep control of things, even if the train speed cruising.

IV. Demerits

The advantages of maglev system on their own seem promising, but not enough to cover the maglev biggest problem: the high cost of the initial installation generated. Although the introduction of a late fast conventional trains, which run on a slow train tracks mean fine, magnetic levitation trains need a new set right from scratch. The present rail infrastructure is of no use maglev's, which must either going to have to create a magnetic levitation system or a new set of replacement, both of which will cost a decent initial investment amount. Even cheap compared to EDS, it is still expensive compared to other models. If these trains are advantages and disadvantages to contend with each other, it can be a bit difficult to come to a specific conclusion. Although the initial cost of setting something higher, a developed country like the United States will not have to worry about the entire infrastructure must be replaced with a new one will be something that will have to catch up with the fact that an expert-22 situation. But obviously, we would have to abolish their disadvantages, if we invest in maglev trains. If successful Shanghai maglev train commercial is to be considered, these trains can be reliably considered future traffic system.

V. Conclusion

Maglev trains will soon be the new way of transport. Several obstacles in the way, but there are also some more improvisation that nothing is impossible. Since there is no engine, no wheels, no pollution, new energy sources, floating in the air, this concept has taken decades to develop and recently its true function have now been achieved. To compete with the high-speed aircraft, ships and effectiveness, security and conventional trains, cars with comfort, this seems to be a promising means of transport. Maglev trains are environmentally friendly, noise pollution is minimized because there is no wheel-rail contact (friction). Maglev trains 150 mph standing work cannot be heard 25 miles away people. The system encourages the conservation of land, where land is expensive or unavailable which is very useful. For the train tracks are easily built on an elevated platform; it is under construction and development opportunities, prevent land anatomy, but also reduce the conflict of animals. This statement can be proved in the construction of the rail throughout the residential areas, schools, places of worship, tourist attractions, practical magnetic levitation train, however, the cost of building these trains run to billions of dollars. The high cost of these trains is the only deterrent to prevent the train being performed everywhere. In this area with an active interest in governments around the world continue to study can be reduced along with the cheaper options without sacrificing security costs greatly.

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