MAGNETIC LEVITATION TRAIN

[1]Himanshu Yadav, [2]Anshul Dubey, [3]Mrs. Monika Bazzad
[1,2]Student, [3]Assistant Professor
Department of Mechanical Engineering,
Mahaveer Swami Institute of Technology, Jagdishpur, Sonipat, Haryana

Abstract: - This paper includes the plan, equipment, and innovation, application and future employments of "Attractive levitation trains." The maglev transportation framework is steadier, quicker, financial, and proficient. Maglev frameworks are as of now being used for applications like orientation, high velocity prepares and producing. Maglev is a technique for impetus that utilizes attractive levitation to drive vehicles with magnets as opposed to with wheels, axles and orientation. With maglev, a vehicle is suspended relatively close to an aide way utilizing magnets to make both lift and push. In future these High-speed maglev trains would give an immense rivalry to the avionics business.

Keywords: - Electrodynamic and Magnetic Suspension, Indus track, Evacuated tube, propulsion, Magnetic Induction

1. INTRODUCTION

Maglev trains move more easily and to some degree more discreetly than other regular trains. And, they don't depend on footing or grating, their speed increase and deceleration are quicker than traditional trains, they are unaffected of weather. The power required for levitation isn't at all the huge measure of the general energy utilization; the greater part of the force in these trains are used to beat air opposition (drag), similarly as with each high speed type of transport. Attractive levitation further develops effectiveness and life of the framework. It decreases the support expenses of the framework. With the assistance of in this paper we attempted to clarify its upside and the need of it in future designing and the world.

2. MAGLEV TECHNOLOGY

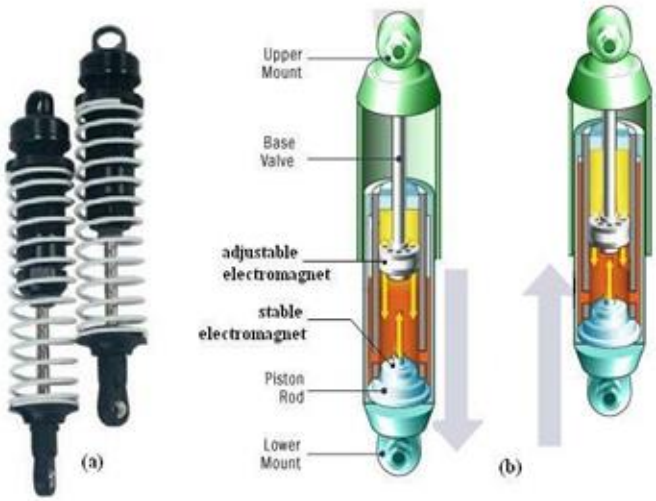
This innovation utilizes monorail track with direct engines, these trains continue forward extraordinary tracks as opposed to the standard regular train tracks. These trains are pushed by the guideways. When the train is maneuvered into the following area the attraction switches with the goal that the train is pulled on again. The electro magnets run the length of the guideway.

3. TYPES OF MAGLEV TECHNOLOGY

1. Electromagnetic Suspension
2. Electrodynamic Suspension
3. Inductrack

1. ELECTROMAGNETIC SUSPENSION

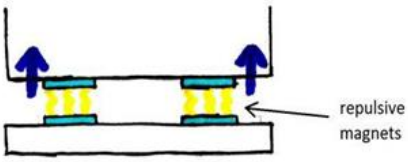
In this system Electromagnets are attached to the train and also attached to the guide way track. They have ferromagnetic stators on the track and they help them to levitate the train. They have guidance magnets on the sides of the track they are laid complete along the track. H. Yaghoubi and H. Ziari (Magnetic fields inside and outside the vehicle are less than the electrodynamic suspension; is proven, commercially that available technology can attain very high speeds; no wheels, secondary propulsion system is required. due to the system's instability and the required constant corrections by outside systems, vibration issues may occur.



2. ELECTRODYNAMIC SUSPENSION

H. Behbahani, H. Yaghoubi, and M. A. Rezvani, (2)

according to this framework Supercooled, superconducting magnets are put under the train. By this framework the train could Levitate around 10 cm. The magnetic field which assists the train with suspending is because of utilization of superconducting magnets. On the off chance that these lasting magnets are set cluster they would likewise be utilized as Inductrack framework. The power in the track is made by incited attractive field in wires or leading strips in the track. In electrodynamic suspension (EDS), both the guideway and the train apply an attractive field, and the train is suspended by the shocking and alluring power between these attractive fields.



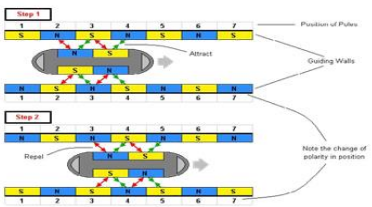
Electrodynamic Suspension (EDS)

3. INDUSTRACK

It is a bomb suspension framework; no force is needed to initiate magnets; Magnetic field is situated underneath the vehicle; they can produce sufficient power at low rates (around 5 km/h (3.1 mph)) to suspend maglev train; in the event of force disappointment vehicles delayed down all alone securely; perpetual magnets are organized in an exhibit which helps in impetus of the trains. they Require either wheels or track portions that move for when the vehicle is stopped. Neither Inductrack nor the Superconducting EDS can suspend vehicles at a halt, in spite of the fact that Inductrack gives levitation down to a much lower speed; wheels are needed for these frameworks. EMS frameworks are wheel-less.

4. FACTORS REGARDING DEVELOPMENT OF MAGLEV TRAINS

1. Propulsion: H. Behbahani and H. Yaghoubi(6), Some EMS frameworks, for example, HSST/Linimo can give both levitation and impetus utilizing an installed straight engine. In any case, a few EDS frameworks and a few EMS frameworks resemble they can levitate the train utilizing the magnets on board but can not impel it forward. Accordingly, vehicles need some other innovation for propulsion. A straight engine (propulsion coil) mounted in the track is one arrangement.



2. Stability: According to Earnshaw's hypothesis, any mix of static magnets can't be in a stable balance. Accordingly, a powerful attractive field is needed to accomplish adjustment. EMS frameworks depend on dynamic electronic adjustment which continually measures the bearing distance and changes the electromagnet current as needs are. All EDS frameworks depend on changing attractive fields making electrical flows, and these can give inactive stability. Because maglev vehicles basically fly, adjustment of pitch, roll, and yaw is needed by attractive innovation.

3. Guidance: A few frameworks utilize Null Current frameworks (likewise some of the time called Null Flux frameworks); they utilize a curl which is twisted so it enters two contradicting, rotating fields, with the goal that the normal motion on the up and up is zero. At the point when the vehicle is in the straight-ahead position, no current streams, however on the off chance that it moves disconnected this creates a changing motion that produces a field that normally pushes and pulls it back into line. This is the direction arrangement of maglev trains.

4. Evacuated tubes: A few frameworks (quite the Swiss metro framework) propose the utilization of (vactrain) maglev train innovation utilized in cleared (airless) tubes, which is utilized to eliminate air drag. This can possibly speed up and proficiency enormously, as the greater part of the energy for customary maglev trains is lost due to streamlined drag. One likely danger for travelers of trains working in cleared cylinders is that they could be presented to the danger of lodge depressurization except if burrow wellbeing checking frameworks can repressurize the cylinder in case of a train breakdown or misfunction.

5. RESULT AND DISCUSSION

Magnetic levitation trains have a lot of applications and advantages like they are fast exceeding the speed of 300 mph., it has no fuel consumption, cost is cheaper than flights, faster, effective, less maintenance. used in transport both passenger and goods, no fossil fuel used, less noise, takes less space than conventional trains.

6. CONCLUSION

These trains burn-through exceptionally less energy contrasted with ordinary trains. They require no enormous motor sort of stuff as they run utilizing direct engines. They Move much quicker than typical trains since they are not influenced by ground rubbing; they would just have air obstruction or drag opposition. They are inconsistent with existing rail lines since they need aseptate track to suspend,

dissimilar to the conventional high velocity trains. Initially the expense is extremely high however it might diminish in not-so-distant future.

REFERECNCES

1. H. Yaghoubi and H. Ziari, "Assessment of structural analysis and design principles for maglev guideway: a case-study for implementing low-speed maglev systems in Iran," in Proceedings of the 1st International Conference on Railway Engineering, High-speed Railway, Heavy Haul Railway and Urban Rail Transit, pp. 15– 23, China Railway Publishing House, Beijing Jiaotong University, Beijing, China, 2010.

2. H. Yaghoubi and H. Ziari, "Development of a maglev vehicle/guideway system interaction model and comparison of the guideway structural analysis with railway bridge structures," Journal of Transportation Engineering, vol. 137, no. 2, pp. 140–154, 2010. View at Publisher • View at Google Scholar • View at Scopus

3. Shwethasingh, Aradhanasingh. "Magnetic Levitation Methods and Modeling in Maglev Trains", 2014 ISSN: 2277 128 xx.

