



National Conference on Information, Communication and Energy Systems and Technologies - 2019 © 2019 IJSRSET | Volume 5 | Issue 7 | Print ISSN : 2395-1990 | Online ISSN : 2394-4099

Hyperloop Transportataion System

Abhijeet Toraskar, Maruti Bawadhane, Vinayak Gurav, Sachin Kahandal

Department of Electrical Engineering, SKN Sinhgad Institute of Technology & Science, Lonavala, Maharashtra,

India

ABSTRACT

There are four modes of transportation like rail, road, water & air. But, they are either relatively slow or expensive. To overcome this difficulties hyperloop concept is develop. In this project, explain the concept of hyperloop transportation system. It is high speed ground transportation system used for passenger & fright transportation. It uses the pod like vehicle which travel at high speed more than airline speed in low pressure vaccum tube. It works on the principle of magnetic levitation. Two permanent magnets are used one for the track and other for pod. So, pod is suspended on track due to the force of repulsion & propelled by the Brushless DC motor.

Keywords : Hyperloop, Magnetic Levetation, Capsule, BLDC Motor, Embedded System, Bearing, Vaccum Tube.

I. INTRODUCTION

The Hyperloop is a concept for high speed ground transportation, consisting of passenger pods traveling at high speeds in a low pressure vaccum tube. The concept was originally proposed in a white paper published by SpaceX in 2013. And it currently developed between Los Angeles and San Francisco, which was deemed too expensive and slow. The Hyperloop concept required for alternative transportation mode for short-haul travel. For short routes, such as Los Angeles - San Francisco the time required for traveling at the cruise speed is quite low compared to overall end-to-end travel time. Recently, KPMG published a preliminary study commissioned by Hyperloop One -one of the companies commercializing the Hyperloop concept - on the Helsinki-Stockholm corridor where they found that the Hyperloop could cut down end-to-end travel time by 75% to 28 minutes. Furthermore, the market share for high-speed transport is projected to grow rapidly over the next few decades, and the Hyperloop concept

could take some pressure increasingly congested airports and light routes.

Momentum is growing in the Hyperloop movement, with a number of newly founded companies attempting to commercialize it. In addition, SpaceX is sponsoring a student competition to encourage innovation and to help accelerate the development of a working prototype, starting June 2015. Over 1,000 teams submitted their intent to compete, and over 100 teams made it to Design Weekend in January 2016. The student team from the Massachusetts Institute of Technology the MIT Hyperloop Team won 1st place overall in that design weekend.

Academic research into the Hyperloop concept has focused mostly on system integration. A conceptual sizing tool using the Open MDAO framework focuses primarily on the aerodynamic and thermodynamic interactions between the pod and tube, with recent work focusing on the energy consumption of the system. The pods for the SpaceX Hyperloop Competition were the rest physical prototypes of the Hyperloop concept.

Hyperloop Transportation Technologies (HTT) was founded with the specific intent to use crowd collaboration as an integral component of its business model, from the first day of inception to becoming a multi-billion dollar company. Jump Start Fund believe that smarter companies will be built that way. The crowd has power, offering opinions and expertise that are difficult to come by easily unless harnessed through collaboration,. The crowd sourcing model has proven itself in a variety of contexts, and has shown that it can beat even the brightest scientists and supercomputers that energy.

II. SYSTM DESCRIPTION

a] Basic Principle

Hyperloop is based on a principle of magnetic levitation. The principle of magnetic levitation is that a vehicle can be suspended and propelled on a guidance track made with magnets. The vehicle on top of the track may be propelled with the help of a linear induction motor.



Figure 1. Construction Diagram of Hyperloop

b]Working of Hyperloop System

Working of hyperloop system is based on magnetic levitation principle. As we know that the passenger pod travel through low pressure tube. In hyperloop system an air compressor fan is fitted on front side of pod which sucks the air. It transfer high pressure air front side to the rear side of capsule (pod) and it propel the pod. It creates the air cushion around the pod, so that the pod is suspended in air within the tube. On the basis of magnetic levitation principle the pod will be propelled by the linear induction motor. By the linear induction motor the capsule send from one place to another place to a subsonic velocity that is slower than the speed of sound. The pod will be self-powered. There is solar panel fitted on top of the tube. By this solar panel there is enough energy is stored in battery packs to operate at night and in cloudy weather for some periods. The energy is also is stored in the form of compressed air. The air between the capsule acts as a cushions to prevent two capsules from colliding within the tube. In above figure it shown that the air through the compressor is send to a bypass nozzle at the rear end of the capsule. If capsule cover too much area of the tube then, the air is not flow around the capsule and ultimately the entire column of air in the tube is being pushed ahead of the capsule and because of this there is friction between the air and tube walls is increases tremendously.

Therefore to avoid this problem the compressor is fitted at the front of the capsule through which the air is flow which will not flow around the capsule and send it to bypass nozzle.



Figure 2. Hyperloop System



Figure 3. Compressor Line Diagram

III. CONCLUSION

- 1. A high speed transportation system known as Hyperloop has been developed in this report.
- 2. Hyperloop transportation system can be used over the conventional modes of transportation that are rail, road, water and air.
- 3. At very high speed it provides better comfort and cost is also low.
- 4. By reducing the pressure of the air in the tube which reduces simple air drag and enables the capsule to move faster than through a tube at atmospheric pressure.

IV. REFERENCES

 Ahmed Hodaib, Samar, et al, international journal of mechanical, aerospace, industrial, mechatronics and manufacturing engineering Vol:10 No:5, (May 2016).

- [2]. Chin, Jeffrey C.; Gray, Justin S.; Jones, Scott M.; Breton, Jeffrey J. (January 2015). Open-Source Conceptual Sizing Models for the Hyperloop Passenger Pod (PDF). 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. January 5– 9, 2015. Kissimmee, Florida. doi:10.2514/6.2015-1587.
- [3]. Paper by Mark Sakowski, "The Next Contender in High Speed Transport Elon Musks Hyperloop", 2016.
- [4]. N. Kayela, editor of scientific and technical department, "Hyperloop: A Fifth Mode of Transportation", 2014.
- [5]. Mohammed Imran, international journal of engineering research, 2016.
- [6]. Musk, Elon (August 12, 2013). "Hyperloop Alpha"(PDF). SpaceX. Retrieved August 13, 2013.
- [7]. and Motion Control Conference, pp. 2658-2663, May 2009.