Hyperloop Transportation System: A New Mode of Transportation

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Abstract: The concept of high-speed travel in tubes has been around for decades and it was first reintroduce by Elon musk and a team of engineers from Space Exploration Technologies Corporation in August 2013, it is a combination of a Concorde, Rail gun and an Air hockey table. This idea seeks to change the traditional transportation by being both fast and inexpensive for people and goods where conventional modes of transportation tend to be either relatively slow, expensive or a combination of both. Hyperloop is a proposed mode of passenger and freight transportation that propels a pod (train) through a low-pressure tube at 750mph which is more efficient and environmental friendly, the pod would accelerate to a cruising speed gradually using a linear electric motor with solar power and glide above their track using passive magnetic levitation. Passengers may enter and exit Hyperloop at stations located either at the ends of the tube, or branches along the tube length. Hyperloop minimizes the carbon footprint globally and also inexpensive and extremely fast intercity travel would be widely accessible. If both people and goods can move more quickly and comparatively cheaply, an economic growth will be noticed as well.

Keywords: capsules, green energy, green transportation, pod, passive levitation, Safety, inexpensive

1. Hope for Hyperloop

As we know present modes of conventional transportation is relatively slow, expensive and also became hazardous due to the carbon emissions and the fluctuating price of the fuel. The last major development in the high-Speed rail was maglev by “Alfred Zehden” in 1902. Rail travel is relatively an energy efficient and environmental friendly option, but is too slow and expensive, these days. Whereas flights are faster but very expensive and you will be treated like Toys for safety, Hyperloop was designed keeping these issues in mind, which aims to make cost-Effective, high speed transportation with a clean and self-powering system.

2. Basic Concept of Hyperloop

Hyperloop is based on a principle of creating our own sky in the tube. When an object is moving, the two types of hurdles found are, Air drag and Friction. So, by using a low pressure tube and levitation, we can overcome these obstacles and achieve cruising speeds.

3. Components

3.1 Tube:

The tube is made of steel and it is double layered to ensure safety. Two tubes are welded together side by side configuration to allow the travel in both directions and are supported by pillars. Solar arrays are provided on the top of the tubes to make this, a self powering system.

Figure 1: Concept of Hyperloop

Figure 2: Construction of tube

Figure 3: XP-1(First generation pod)

3.2 POD:

The pods are similar to train bogie and first generation pod of hyperloop is Xp-1 (fig 3) is made with sandwich system, where you have outer and inner skin that makes you sure that your always safe. Each pod can carry 28 passengers per travel. Permanent magnets are arranged at bottom of pod for levitation and augmented windows are arranged in Xp-1 pod for refreshment of passengers.

PYLON:

The tube will be supported by pylons which constrain the
tube in the vertical direction but allow longitudinal slip for thermal expansion as well as dampened lateral slip to reduce the risk posed by earthquakes. These minimally constrained pylons tube joints will also allow a smoother ride, the average spacing is 100 ft (30 m) and the pillars will be 20 ft (6 m) tall whenever possible but may vary in height in hilly areas or where obstacles are in the way, pylons are not required in all the places.

**Green transportation**

This system is completely green as we use solar, wind, kinetic energy by regenerative breaking and in some climates even thermal energy which do not harm environment. Now it’s important not just because it’s green but it also produces more energy than it uses and that’s a big benefit along with very low operational costs.

**Comparison**

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**Installation cost of High speed rail and Hyperloop**

High speed rail required more energy to power electromagnets for levitation and more lands are to be bought for construction of high speed rail whereas a Hyperloop technology uses passive levitation which do not require energy to levitate and also it’s a self powering system and needs less land for its construction. So both the installation and maintenance costs will be very low.

**Disadvantages**

- Tube pressurization
- Turning will be critical
- No answer for equipment malfunction, accidents, emergency evacuation

**4. Conclusion**

The Hyperloop would be the first truly revolutionary new transportation system in half a century, which could radically change the time and cost equation for travel and transport between nearby cities.

It is considered an open source transportation concept and will be available soon in many countries, which can transport people and goods at a speed of 760 miles per hour. It produces more energy than it consumes, takes lesser space for construction and also incurs very cheaper costs, when compared to super fast Rail.

Additional technological developments in Hyperloop and further optimization could likely reduce the price even further.

As the global population is increasing and the environmental values are declining, a better mass transport system like Hyperloop is definitely essential, in this world.

**References**


