**Concept Paper: Maglev Trains - A Top Trend in The Transportation Industry**

**Section 1: Problem Statement**

With the increased complexity of life and tasks, people need better and safer travel modalities. Moreover, traffic jams have become the norm of life, and no one likes being stuck in traffic. Traffic jams waste a significant amount of resources that would have otherwise been highly profitable had it been directed elsewhere. In the USA, traffic jams waste about 5.5 billion hours and 10.9 billion liters of fuel (Liu et al., 2015). This goes to show the extent to which better, faster and safer means of transport are necessary. Getting to work faster and safely would ultimately boost revenue generation and the quality of life for many people. For this reason, people have kept innovating newer and better means of transport over the years, all in a bid to kill travel time and increase productivity.

Since time immemorial, transport has been key for connecting people and cultures. It has led to the sharing of knowledge and has basically transformed the world into a global village. Prosperity in societies has been prompted by excellent and effective means of transport (ASME, 2021). For instance, the Roman empire became prosperous due to its transportation systems. Therefore, we can borrow a leaf from these early civilizations and note that transport precedes development. Moreover, for development to stay continuous and constant, it has to be backed by an excellent transport system.

**Section 2: Solution Specification**

To come up with an effective transport solution, the key features necessary for such a solution need to be specific and detailed. This is essentially because deciding on the best solution for such a big predicament might be challenging in a world filled with new innovations. In this section, the topmost preferrable specifications that would best serve to define the needed solution have been discussed in depth.

1. Environmental Friendliness

We need to be careful not to solve one problem and introduce another. The modalities of transport that are currently in place mostly use fossil fuels which impacts the environment negatively. In this context, effectiveness is not solely about saving time and being safe for passengers; rather, it is all-rounded. New transportation trends ought to be environmentally friendly, considering the severe damage that fossil fuels have done to the environment this far.

1. Safety

Safety is a primary concern in any transport trend. This is essentially because different modes of transport have led to the loss of a significant amount of lives. As such, safety is a major concern for users of any transport modality.

1. Efficiency – Less Travel Time

In order to address the time wastage element of traffic jams, new transport trends need to be faster and more efficient. Everyone hopes to get to their destination faster, and if this can be done safely, then everyone will be on board. An effective transport solution would have to be fast so as to cut travel times while simultaneously assuring safety.

**Section 3: Literature Review**

Currently, the electric and maglev trains are the best inland means of transport for short distances. However, the two vary significantly in numerous dimensions. Hence, in this section, both have been discussed in a bid to shed more light on their effectiveness as transport trends.

1. Hybrid Electric Trains

Electric trains are a type of locomotive that is powered by electric energy. These trains are powered by external energy sources, which could be either a third rail or overhead line. These external sources use electric energy generated by windmills, diesel, or hydroelectric power (HEP). Over the years, electric trains have been modified to become safer and faster. Currently, the latest electric transport locomotive trend is the train's hybrid version, which uses significantly less electric energy and moves faster than the traditional version. Electric trains could go a long way in reducing traffic jams in the world. Additionally, compared to other modalities of transport like cars, they are much safer and faster.

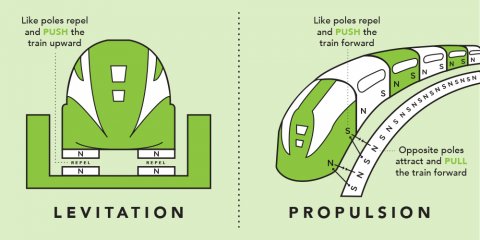
1. Maglev Trains

Maglev trains are the latest type of locomotive trains. Maglev trains, as the name suggests, utilize magnetic levitation in their operation. James Powell, one of the brains behind this transport trend, first thought of this idea while sitting in a traffic jam (Liu et al., 2015). He wondered how people could travel faster and safer on land, and it was then that he thought of maglev trains and decided to come up with the first patent. The first of such trains was launched in Shanghai in 2004, and since then, it has grown in popularity continuously.

**Section 4: Recommended Solution**

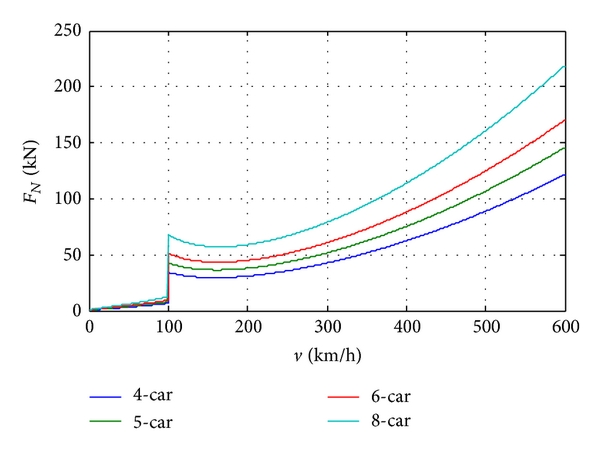
I would greatly recommend the maglev trains to any nation seeking to reduce their traffic jam predicament safely. The magnets employed in maglev trains are superconducting, which essentially means that they are cooled to below 45 degrees Fahrenheit, and hence they can generate a magnetic force field more than ten times stronger than ordinary electromagnetic (Liu et al., 2015). Such a force field is sufficient enough to suspend a train and propel it. This suspension eliminates friction, thus making the train very fast and also reducing wear and tear (ASME, 2021). Maglev trains can attain speeds of up to 375 MPH, which is sufficient enough for an on-land transport modality.

Figure 1: Illustration of Levitation and Propulsion of Maglev Trains



The propulsion technology used to propel the trains is similar to that of stator synchronous motors. Therefore, changes can be made to the power supplied to the magnets to reduce resistance when needed. Below is a representation of the total resistance of maglev trains by size. The illustration shows that total resistance increased with weight being propelled.

Figure 2: Running Resistance in Maglev Trains



**Section 5: Conclusion**

Conclusively, transport is a very vital element in our day-to-day lives if not the most important. Transport defines all other industries, and therefore, innovations in this industry should be taken very seriously. Transportation innovations should be continuously revamped to accommodate the growing transportation needs of the ever-growing human population. Traffic jams and other delays on the road significantly impact operations, and they should be done away with promptly. Moreover, they are linked to massive resource wastage. Maglev trains are by far one of the most well-thought transport modalities that are safe, efficient, and environmentally friendly.