**The Efficiency of Magnetic Transportation**

As the world continues to get smaller and the work environment more hectic, the need for different methods of affordable transportation continues to increase. Of course there are more fuel-efficient cars, electric vehicles, subways, trains, and buses but ultimately the problem of innovation in transportation persists. Our solution to this problem is the addition of magnetic levitation as one of our options. Magnetic levitation is currently being used in places such as Japan but has yet to be expanded on a worldwide scale.

There are both advantages and some disadvantages to magnetic levitation (maglev) forms of transportation. One of the benefits is the significant reduction of carbon emissions. Since maglev is powered by electricity and doesn’t require gas or any fossil fuel to function, it produces nearly zero emissions when in operation. Additionally, as maglev doesn’t require the magnets to touch during operation, it doesn’t create any type of friction. Oil preservation is also another benefit. Again, since electricity is the primary source of power, much less oil and fossil fuels would be needed for operation, thereby reducing fueling costs. Another benefit would be that as maglev technology continues to improve, ultimately the costs associated with this type of travel would significantly decrease, making it that much more affordable. We anticipate that at some point the average maglev train ticket would cost about $10 compared to the average conventional train ticket price of $30-50. We project that at such low costs, another form of major transportation would now be much more affordable to lower income individuals while also being equitable. It would also reduce both road and aviation infrastructure maintenance costs.

Probably the major disadvantage of magnetic transportation is that it can be extremely expensive as it doesn’t use current existing infrastructure. However, once implemented on a mass scale, it can boost the economy and benefit the country. Another negative of maglev would be, as mentioned, the costs associated with the maintenance of the infrastructure that needs to be created. Of course this would create an entire new industry, but the costs associated can be astronomical if not managed correctly from the onset. Even though magnetic levitation is the way to go, it becomes inefficient for medium sized vehicles. Building the magnetic infrastructure needed for medium sized vehicles will be very expensive and not as beneficial as methods of travel.

The purpose of our code is to find the Magnet to Force Ratio. The reason why this is needed is because different magnets have different strengths. We intend to implement the code into a maglev train simulation. We will also run calculations to see how the U.S. economy will benefit from Maglev Trains and other methods of travel based on electricity (EVs and E-Bikes). We fully expect to see statistical data that either confirms or contradicts our ideas about maglev travel. We have been keeping tabs of recently developed magnetic technology that we plan to use. We have been testing and experimenting with an Express Maglev Train Model OWI-633 that we purchased from Facebook marketplace. The results that we are looking for are efficiency, expense, and environmental impact of the vehicles. We expect these answers to help solve the issue of public transportation. We intend to focus on transportation first in the U.S., then onto other places like India, Mexico, Canada, then globally.

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