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EVALUATING A NEW FUTURE IN LOGISTICS WITH MAGNETIC LEVITATION[1]

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ABSTRACT

The transportation sector has been generally acknowledged as the most important sector in developing countries. In recent decades, mankind has striven to find a better way for cheap energy and fuel that will not harm motherland and the future of new generations. There are many who support green logistics and there are many who have found the solution in hybrid and electric vehicles. On the other hand, there are people who think outside of the box and search for the best solution. Use of MagLev (Magnetic Levitation) would be a wise and long-term profitable solution for environmental problems. Using Maglev in civil transportation is not a dream anymore, but using it in logistics would be as effective as civil transportation. With its high speed, it would be an amazing surplus for logistics timing. Maglev is being used in Japan as a prototype for the railroad sector and there are some small tech-businesses, which use MagLev to float some small objects like lamps and other decoration stuff. Maglev Trains are trains produced by applying simple magnet applications between train and rail. One of the two magnets, which are suitably placed one after the other, can stand in the air without touching the other with the effect of magnetic repulsion forces. The same principle is that the Maglev train hangs on rails. The aim of this article was to evaluate a transportation future that would allow us to carry products with high speed, subsequently resulting in a massive gain in time. On the other hand, with evaluation of technology on this topic, it will cause less harm to our world compared to petroleum and other fuel types. The article defends that there will be an end for this planet, and hence, we should take prompt action. To slow this inevitable end, we should begin by stopping wasting our air, use less petroleum, stop wasting land and gain huge amounts of time, which would be a surplus. This is not a hundred percent win situation, but we should begin by trying this out. Thinking is half of the path to success.

Keywords: Energy, Transportation, Environment,

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INTRODUCTION

“Maglev train, also called magnetic levitation train or maglev, a floating vehicle for land transportation that is supported byeither electromagnetic attraction or repulsion.” (Britannica). Firstly maglev transportation system is not a different form of railway. It is something much better and much useful for the future. It doesnt hurt mother nature as other transportation systems and there is no way that maglev trains would crush. Maglev has an amazing speed which is almost 600 kilometers per hour. Its science is simple passing magnetic arrays over a conductive loop creates a magnetic field, or force. At a critical velocity the induced magnetic field will be strong enough to create levitation, and the magnetic force may be used to create propulsion. Basically the vehicles ‘surf’ along a track on an air gap, lifted by magnetism and guided by magnetic side panels: they can not fall out of the track. Some were thinkin that “maglev is a dead end” but nowadays whole world started to see maglev as an opportunity.

Maglev can be the next biggest opportunity and will create competition between countries. There will be new routes for the Maglev but it’s not going to be easy to schedule these routes. Every country will demand to have it passing by through their own lands. On the other hand these routes will create new logistics headquarters, new business areas and a big volume for international trade. These benefits won’t be cheap. A big route between Europe and China would cost more than 400 billion dollars. So countries needs to abandon their spendings on military, automotive, transportation expenses for sure. “Maglev systems can integrate with existing exchange nodes, but importantly we think that maglev will offer a new hub & spoke concept quickly delivering goods and people at 500km/hr over hundreds or thousands of kilometres, with standard electrified rail passing on the goods over a limited few hundred kilometres and road logistics being involved only for the ‘last kilometer’, where they can use their flexibility effectively. This integration will reduce global pollution by moving long-haul freight from road, sea and air, and even from the less efficient standard rail, onto the very efficient, fast, non-polluting maglev. And of course, more flexible transport modes will open up hinterlands.” (HIGH SPEED MAGLEV LOGISTICS. John B Kidd Aston Business School, Birmingham Marielle Stumm INRETS)

HISTORY OF MAGLEV

In November 1962 ***The Engineer*** reported on Dr Eric Laithwaite’s pioneering development of Maglev transportation technology.

Despite decades of development and a growing worldwide interest in high speed rail, Maglev – a futuristic transportation concept that uses magnets to propel wheel-less trains along track at super high speeds – has had surprisingly little impact on the transportation mainstream.

And with most of the current development in this intriguing field taking place in Japan, Korea and China (home to the 270mph Shanghai Transrapid system) it’s often forgotten that the technology was originally developed by British electrical engineer Dr Eric Laithwaite, inventor of the linear induction motor and the so-called “father of Maglev”.

In November 1962 The Engineer reported on one of Laithwaite's early efforts to demonstrate the technology, aboard an experimental rail trolley, at British Railway's Gorton Locomotive works.

In the early 1970s, Laithwaite continued to work on the technology over the following years and discovered a new arrangement of magnets that allowed a single linear motor to produce lift and forward thrust, allowing a Maglev system to be built with a single set of magnets.

This "transverse-flux" system was eventually developed into the first commercial Maglev in the world, which ran on an elevated track between Birmingham Airport and Birmingham International railway station. The system, which began operating in 1984, was closed in 1995 due to reliability problems.

MAGLEV BENEFITS

Maglev is -Eco friendly, it doesn't pollute air with carbon.

Maglev has -High safety, with the power of magnetism, 2 maglev trains can not hit each other and they can not fall out of the track.

Maglev needs -Low maintenance cost, there is only a big cost at the beginning.

Maglev does not make -Noise, it doesn't create noise pollution.

Maglev does – Much higher speed than other transportation systems (except planes),

Maglev -Operates punctually in all weather conditions.

COMPARISON OF MAGLEV WITH TGV AND OTHER SYSTEMS

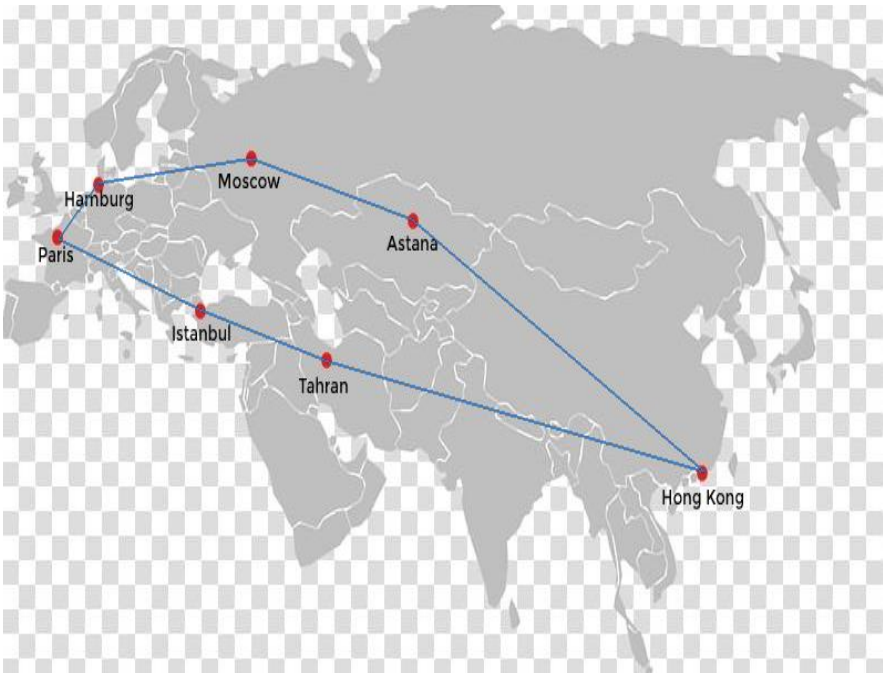
Table 1: Maglev vs. other systems

Aspect	*Maglev*	*TGV and other rail*
Costs		
Track costs	27 €m/km (might reduce due to learning curve). Construction may be less polluting than TGVs.	TGV: 34 €m/km – is the current European average. Other rail: ≥10 €m/km
Vehicle costs	2.5 €m per unit (includes magnets, etc)	TGV - 1.5 €m for passenger units 3.0 €m for engine units (2 per train)
Operational costs	Very low – no moving parts Maglev is electrically much more efficient than TGV.	Much higher – motors, wheel, track & pantograph wear. TGV more efficient than standard rail systems.
Freight and passenger delivery volumes	Probably 600,000 TEU/day one-way track. Many passengers can also be accommodated. All at ~500 km/hr	TGV for passengers @ 250km/hr Standard rail – for freight & people. 5,000 TEU/day (much slower than TGV)
Operational factors:		
Signalling	Same as for TGV but safer with total separation of track from people, animals and other traffic.	TGV is very safe, but constructed at-grade so more at risk of crashing into objects on track.
Acceleration/ deceleration	LSM motors very strong: very much better than TGV. Faster to top speed, quicker to stop. Can have very close headways	As with all wheeled systems is dependant on friction – and thus needs long headway to allow for stopping. Also slow acceleration.
Pollution aspects	Uses much less electricity than TGV as LSM is more efficient than electric motors. Implicitly much less polluting as less electricity needed.	TGV needs less electricity than standard rail. Electricity has large up-stream pollution costs, yet is clean in use.
Route design:		
Route gradients	Can climb/fall gradients over ± 10% with strong LSM 'motors':	Limited to ≤4% due to wheel skidding
Twists & turns	Units can be banked to ±30° tilt, also passengers are OK with 8°/second roll rate - so can run at very high speed round tight bends in mountainous regions.	Can't be banked much, needs large 'flat' curve radius for high speed – limits route design: tight bends severely reduce speed.
Route planning	Good ability to rise/fall, twist & turn allows maglev to follow open routes minimising need for tunnels	High speed needs track to be straight and 'flat' so many tunnels and bridges are needed.

INTERNATIONAL LOGISTICS ROUTE FOR MAGLEV

I believe that maglev would make a great change in Logistics, its usage is on public transportation but logistics can benefit alot with maglev. Here is a planned route which will increase international trade between Asia and Europe.

Route would start from China and would pass through these countries: Kazakhstan, Russia, Belarussia, Poland, Germany, Netherlands, Belgium, France, Switzerland, Austria, Hungary, Romania, Bulgaria, Turkey, Iran, Afghanistan, Pakistan



FUNDING SOURCES

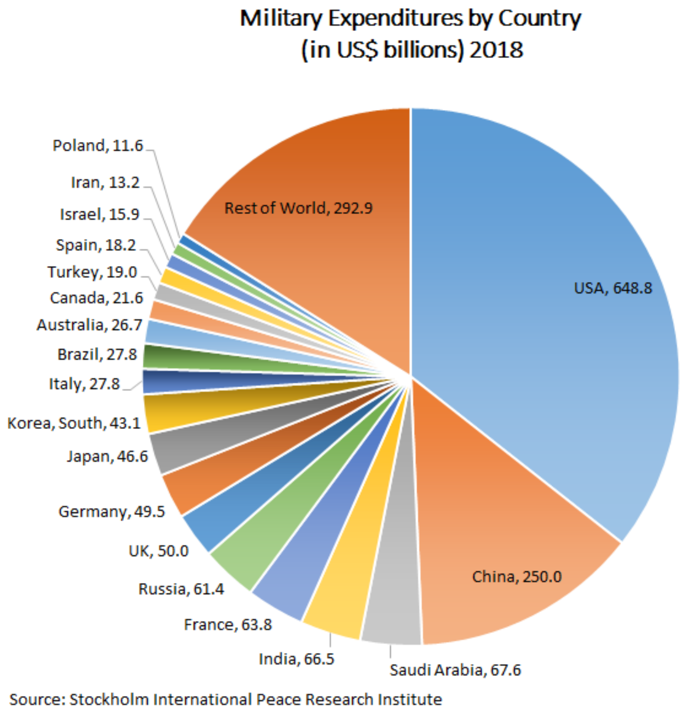
In their research at 2008, John B Kidd Aston (Business School, Birmingham) and Marielle Stumm (INRETS, Arcueil, France) made a calculation. They called this logistics installation of ultrahigh speed maglev logistics backbones from China to Europe as Eurasian Landbridge.

Here is their calculation and the solution to fund it:

"Maglev implementation needs considerable cash injections over time. We note the huge foreign reserves held by some nations. China is one such nation with $898 billion, and Japan's reserves are slightly higher (Economist, 2007). Even Central Asian countries are not short of cash (Floerkemeier & Sumlinski, 2008): generally this is true globally (Aizenman, 2007).

These authors say the study of reserve adequacy and optimality provide valuable insights for policymakers and can help guide monetary and reserve policies. “

- They note: Maglev Eurasian route might cost $400,000,000,000
- The Iraq war may have cost over $3,000,000,000,000



List by the Stockholm International Peace Research Institute
2019 Fact Sheet (for 2018)[1]
SIPRI Military Expenditure Database[3]

Rank	Country	Spending (US$ Bn.)	% of GDP
	World total	**1,822**	**2.1**
-	NATO	1036.1	2.5
1	United States of America	649.0	3.2
2	People's Republic of China[a]	250.0	1.9
3	Saudi Arabia[a][b]	67.6	8.8
4	India	66.5	2.4
5	France	63.8	2.3
6	Russia	61.4	3.9
7	United Kingdom	50.0	1.8
8	Germany	49.5	1.2
9	Japan	46.6	0.9
10	South Korea	43.1	2.6
11	Italy	27.8	1.3
12	Brazil	27.8	1.5
13	Australia	26.7	1.9
14	Canada	21.6	1.3
15	Turkey	19.0	2.5

CONCLUSION

Maglev is all about a brighter future, and we need to take actions before it is too late.

For our country and for our world, maglev will be a big impact. Due to the high logistics potential Turkey should use its geographical advantage and take a big action on this opportunity. We need to support what is best for future and fight against bad influencers on this purpose. In this case i suggest this sentence «Believe you can and you're halfway there» (T. Roosevelt)

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