Transportudvalget 2014-15
TRU Alm.del Bilag 84
Offentligt

Newsletter 2014 - 6

2014-11-28

Magnetic-train Scandinavia

News

Welcome to the only inter-Nordic newsletter about magnetic-trains.

Sweden

An increased number of train operations from Oslo to Göteborg is expected in the future. That will probably increase the pressure on the current infrastructure in the are. Link

Denmark

DSB got an official report from SBB CFF FFS about the problems involving the IC4 trains. Link

Norway

“Norges Bank” have investigated how successful of different investments have been with further interests in rail based transports. Link

International

EU and TEN-T is looking on a big trans European rail network connection Link Link

ThyssenKrupp have presented a new elevator concept with maglev based elevators that utilize there experience with Transrapid in creating the next generation elevators Link

Emsland Test Facility

Series – Magnetic trains around the globe

After a lot of low and high speed testing on short tracks in the seventies (west) German industry and government realized that they needed a longer testtrack so they could test trains under high speed and realistic conditions.
Construction started 1980 and the first part opened 1983.In 1984 for the first prototype of the new test facility. The speed record was sett to 302 km/h.
In 1987 the track was lengthened with two switched-loops that allow train to go continuously in one direction. The record was increased to 413km/h.

In 1989 the facility was upgraded with a new train the TR07, but the track remains virtually unchanged, the speed record was increased to 450km/h. Again in 1999 a new train was introduced the TR08 , this time the first series of production trains.

Image source – Transrapid: TR08 first production model at the test facility

After a tragic high speed crash in 2006, the highest speed train crash yet today, a large part of the system was redesigned.
New cheaper Guidway-segments, new more efficient power components, a new train, non contact power transfer, and a new train. New Guidway-switches was also developed but never installed.
Approximately 1.2 million km have been traveled on the ETF and the old switches have made about 80 000 switch overs each with out a single problem.

North to South EU express line

Part 6: Local maglev systems

Most of EU have an aging rail network that is mostly in good condition although rather old. The capacity is also low in large part of EU, and freight is competing with passenger staggering economic growth
This is specially true in center-east part of Europa Eastern-German, Poland, Austria, Czechia, Slovakia and countries there about. The economy is improving but is more and more blocked by transportation issues. Most of the issues is solved by air traffic, but its not really a brilliant long time solution.
A new segregated high speed transport system is needed.
Generally high speed rail-system is considered to expensive to install even in the more prosperous east European states. This is partly true due to high installation cost, but the biggest problem is high per passenger running cost.

Map of a potential center-east EU maglev system

It doesn´t matter how many travelers do ride a HSR system the ticket price can never be under the per seat running cost.
With almost half the per seat running cost the maglev train-systems combined with high population density in central-east Europe the transport cost can probably be lowered quite a lot under what is possible with translational transport system. Combine high density inter-

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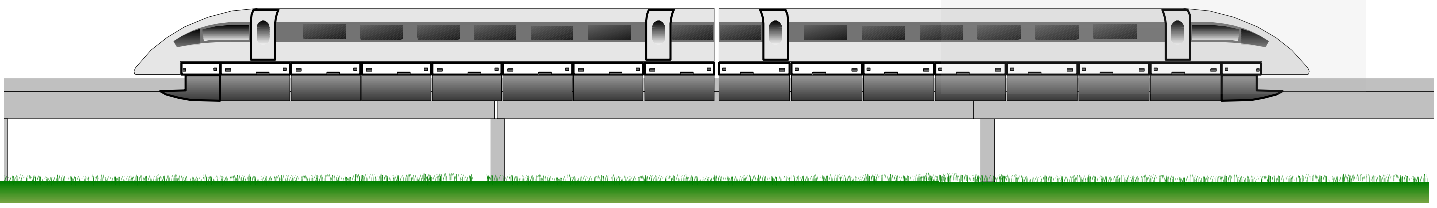


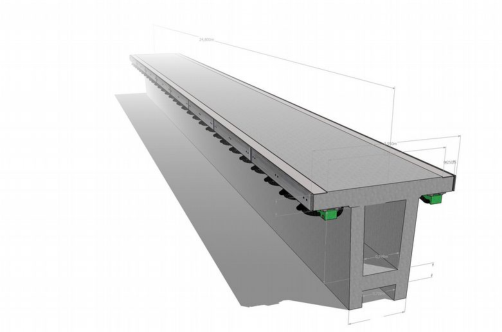
urban travel, with high speed freight and long distance air-travel replacement, and there is a good possibility of covering the expenses of building the infrastructure.
The central and eastern Europe have in this studdy been divided into 4 parts. North-eastern, North-central, South-central and South-eastern.
NORTH-EASTERN (orange) starts in Helsinki and ends up in Vienna with approximately ground distance of 1100km is by far the longest leg. Total traveling time is between 2:10 and 3:10 depending on number of stops. The cost is hard to approximate in an international environment, but with a standard rule of thumb approximation that is possible. The initial tunnel from Helsinki will probably cost around €4B, taking the shortest path over. From Tallinn to Southern Poland its mostly rural areas and the last leg is mostly hilly and some part mountainous we estimate a total cost of just under €30B. Under ground station will cost additional funds.
NORTH-CENTRAL (purple) is suppose to connect to a yet to be planed Danish maglev network. Total ground distance is about 600km including 26km of under water tunnel. Total traveling time is 1:20 to 1:50 depending on number of stops. The German part is surprisingly rural but the Czech part is quite mountaineously. Tunnel cost is probably around €3B and rail-cost of about €17B.
SOUTH-CENTRAL (green) is about 700km ground distance. Traveling time is 1:30 to 2:20 depending on number of stops. No under sea tunnels is needed but some mountains tunnels may be needed in the mountainous part of the alps. Build cost is probably just over €20B plus possible need of tunnels.

SOUTH-EASTERN (Yellow) is about 1000km long and the traveling time is probably 2:20 to 3:30 depending on the number of stops. There is no under sea tunnels needed, and probably no mountain tunnels. Total build cost is probably around €25B. The total rail and tunnel cost is probably around €100B. Trains and stations is excluded. The cost of local stations may be subsidized by local government and the train owned by the transporting companies.
With 15% EU covering and 30% loan a country as Lithuania may have to pay about €1.5B up front. For Poland the up front cost will be about €5B, but will interconnect 5 large cities with a solid international connection
The investment may be payed back with interest over a 40 year time period. Black dashed lines represent possible national additions.
Helsinki – Vienna: 1100km/h, 180 min with 12 stops
Copenhagen – Vienna: 600km, 92 min with 6 stops
Vienna – Napoli: 700km, 115min with 8 stops
Bratislava – Athens: 1000km, 150min with 8 stops

Technology explained

How does Transrapid TR09 work

Transrapid TR09 is the newest iteration of high speed maglev transport system from Europe. Its a great upgrade from the trains used at Shanghai airport with a lot of cost and maintaining saving features. Its also more efficient and faster.
The new system features a integrated prefabricated rail segment system where all the functions are preproduced in modules ready to place and easy to transport. This reduces both cost and erection time significantly.
The train have been equipped with highly efficient optimized lifting magnets that is not super conducting still almost as efficient This in combination with efficient LED-lighting and an all new AC and



A Transrapid ready to use rail segment.

heating system reduces the on board power use to a small fraction of the previews system. This in turn allows for non contact inductive power transfer,cutting down maintainers cost to a small fraction.
The new high efficiency electronic power converters reduces the all over power consumption by 5-10%, this in addition to regenerative breaking also reducing power consumption 5-10%.

The new TR09 may not look that difference, but there is hundreds of aerodynamic tweaks

The new train shell is a lot more aerodynamic and the new undercarriage can lift an additional 10 tons per section. Everything adds efficiency and push down cost. The new system uses less power, is about 30% cheaper to build and cutting down track maintenance cost to just over one quarter relative to medium speed train systems.
TR09 is a huge upgrade over the system that is available in Shanghai.

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