Newsletter 2014 - 3
2014-04-24
Magnetic-train Scandinavia

News
Welcome to the only inter-Nordic newsletters about magnetic-trains.

Sweden
The Swedish government agency Trafikverket declared earlier this month that they have studied the possibility to make the track in “Östlänken” (Stockholm-Linköping) raised up over the landscape in stead of cutting throw it. This method give great environment and building speed advantages. With raised track inspired by maglev-track, have some, but not all of the advantages. Trafikverket still is not comenting on maglev tecnology.

Denmark
The Danish Parliament's Transport Committee receives on 2014-04-24 this magnet train group in an audience where a new series of OH are being displayed (link) and a number of development opportunities will be presented. Link

International
The Nordic “8 million city” group has organized the final conference. We have initiate dialogue with the group and future development areas.

Ole Rasmussen (DK) from magnetic train group attended the conference.

Transrapid Test Track
Series – Magnetic trains around the globe
In early 1980 it was obvious that Transrapid needed a full scale test track. The first part was finished in 1984. In 1985 the track was complemented with a southern circular track section, and in 1987 a northern high speed circular track, so the train could run continuously.

Above: Transrapid TR09 on transrapid test track
The first train tested on the track was the Transrapid TR06, it topped out just over 400km/h. A lot of data was collected from TR06 and in 1989 a radical new train, the TR07 with improved aerodynamics, suspension and lifting mechanism. The mas was also lowered considertably. A new cheaper track segment was also developed, significantly decreasing cost of track constraction. A handful of segments was instated for durability testing. After 15 years of testing in 1999 the TR07 was updated in a TR08 pre-production, ready for regular service. A new concrete hybrid track section was also developed do decrease track installation cost more. This system is almost identical to the one later installed in Shanghai. In 2007 after years of experience in regular service a TR09 was developed with a high number of improvements over the TR08. With everything from increasing comfort, to reducing maintenance cost. The old transistors was also replaced by modern transistors reducing energy consumption.

Copenhagen to Aarhus
Part 3: Denmark
Series – Scandinavian parts
Proceeds from the newsletter in March in the series on Scandinavian routes. This is not a professional investigation, but only a few different options over how a stretch would able to go. Calculations are made with the same program as the official investigation.

Total distance: 180-190km
Estimated cost: £ 50-65 billion
Stations: 5
Population city: 1.7 M cents.
Total population: aprox. 2.5 M metro
Direct travel documents: ~550k/month
Further connecting: ~680k/month
Km cost directly: 120-165öre/km
+ Connecting Göteborg: 95-133öre/km
+ Connection Oslo: 90-125öre/km

(estimated using the same model The model is not optimized for conditions along the route and therefore can distinguish one part against expecting real results). Model assumes direct land rout from Aarhus to Kbh. If this is not available the number of travelers will be significantly higher, and as a effect cost lower. There is no model available to date doing this estimation.

See map overleaf
Track can use a new south exit from Copenhagen with extensive tunnel-work, or a north exit following the same route as Goteborg to Copenhagen line, reducing cost, but also reducing capacity. Following a somewhat straight line across Sjaelland there is the possibility of stop near Roskilde and Kalundborg reducing the strain on existing commuter service. Over Katsegat to Samsø there is needed a tunnel to allow for shipping to pass with unlimited size. Using Samsø as a staging platform the tunnel can exit and using a medium size bridge allowing small and medium size ships to pas. At Samsø a new city can be built with mere minutes access to both Aarhus and Copenhagen center. Over to Aarhus a direct bridging low cost Transrapid track can be built. After reaching Aarhus a station can be build just south of the city to reduce cost and building time, or near center in a tunnel for intimate city access. Future expansion can be built right trow Aarhus to be split up in two single track lines to access both Aalborg and Esbjerg to a reasonable cost.

Continue 2nd page
Traveling time from Copenhagen:
- Roskilde: 7 minutes
- Kalundborg (1 stop): 17 minutes
- Samsø (2 stops): 25 minutes
- Aarhus (non stop): 25 minutes
- Aarhus (3 stops): 38 minutes
- Randers (1 stop): 33 minutes
- Aalborg (2 stops): 47 minutes
- Hedensted (1 stop): 35 min.
- Billund (2 stops): 45 minutes
- Esbjerg (3 stops): 57 minutes
- Landvetter (4 stops): 50 minutes

Samse in year 2040? This could be true for the Samse, but Århus C only 7 minutes away and Kbh 25 minutes, it becomes very attractive to live on the island.

Technology Explained
How does Transrapid TR09 works
Transrapid trains are similar to Linimo trains in having lifting magnets under both sides of the T-shaped track. But while Linimo uses a passive magnetic field, Transrapid is lifting in a moving electromagnetic field. That is Transrapid uses the same magnetic field for both propulsion and lifting. The induction power transferred is a system unique to TR09 reducing maintenance cost for both vehicle and track to a fraction of other systems. Transferring power to the train cordless, similar to an electric toothbrush.

The picture shows one of the two symmetrical sides of a TR09 Transrapid track. The component viable, Steel guide, Linear motor and Induction power transfer is the only component needed on the TR09 track.
Guide-way is made almost exclusively of concrete, the only exposed steel is the steel guide, reducing both up front cost and maintenance
Linear motor made of rubber and aluminum and completely shielded from the sun by the track. All transformers and power-supply equipment is situated in secure areas every 50km with only small relays situated every 4 km next to the track.

Transrapid TR09 is arguably the most modern magnetic-levitation transport-system available on the market today, replacing relay station with electronic inverters could both increase efficiency and reduce maintenance.

Modular system
A great advantage with Transrapid transport system is that its totally modular, making it possible to upgrade part by part.