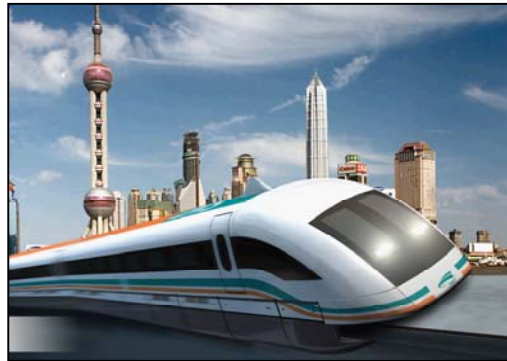


The Maglev System Transrapid – a future-orientated Technology for track-bound Transportation Systems

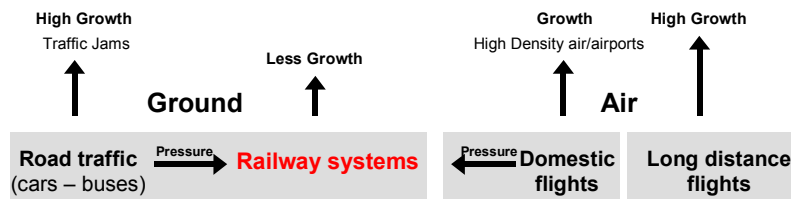
Dipl.-Ing. Gerhard Wahl

*Vice President, Siemens Transportation Systems
Executive Coordinator for Transrapid*



For efficient and ambitious countries the economical and competitive market demands, also for the “mobility market”, are of utmost importance. A reasonable and economically healthy “modal split” between earth bound traffic and flight traffic can only be accomplished if the single transport systems satisfy the market and the national economy demands.

Market Mobility – Actual Situation



In all industrial countries, in all growing national economies the modal split should be changed in favour for track bound systems. Competitive factors are therefore decisive such as

Attractiveness – Efficiency – Speed
Environmental Friendliness – Safety

Will a new track bound transportation system –
the Maglev system Transrapid –
fulfill these requirements?

With the maglev system Transrapid a track-bound transportation system is now available which at first fulfils the requirements for high-speed transportation systems:

- fast
- attractive
- efficient
- light weight
- energy efficient
- quiet
- environmentally friendly
- safe

and secondly fills the gap between conventional rail systems and air traffic and will be a highly efficient completion between rail systems and airplanes. The Transrapid system can serve as point-to-point-connections, for “back-bone”- nets or as fast airport connectors.

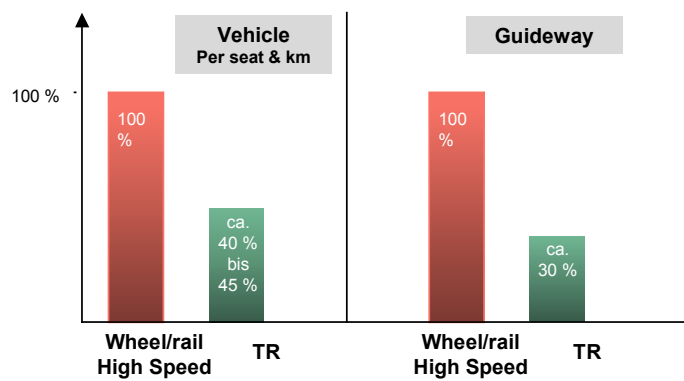
The Transrapid System with its outstanding technical and system attributes which will be explained in more details in my speech, will move and open up the limits that had to be accepted within the steel wheel-on-rail system.

➤ **Technical attributes**

	HS Railway	Transrapid
<ul style="list-style-type: none"> Operational speed 	250 - 300 km/h	400 - 500 km/h, even with speeds under 400 and 300 km/h favorable system characteristics, as there are low noise and low energy consumption.
<ul style="list-style-type: none"> Acceleration from 0 to 300 km/h 	approx. 20 - 23 km	approx. 5 km
<ul style="list-style-type: none"> Grade climbing ability 	4 % maximally (only possible with distributed propulsion)	10 %
<ul style="list-style-type: none"> Propulsion equipment 	Max. propulsion power must be carried on board	Propulsion power tailored to the requirements of the track and the operation program

➤ **Operation costs – favourable life cycle costs**

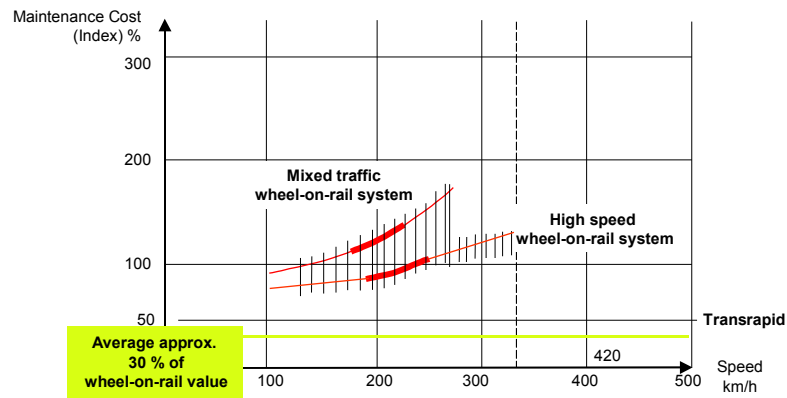
- energy-effective (about 25-30% less energy consumption with V=300 km/h compared to wheel-on-rail systems)
- Guideway maintenance costs are independent of operating speed
- Less manpower necessary – fully automatic system



The fulfillment of the values of TR still has to be checked with the first commercial applications.

Guideway Maintenance Costs: Dependence on Speed Comparison of Wheel-on-Rail and Transrapid System

For wheel-on-rail systems, the track (guideway) maintenance costs increase with operating speed.
For the Transrapid system, the guideway maintenance costs are independent of operating speed.



➤ Ecology

	Transrapid	Railroad	Highway
<ul style="list-style-type: none"> Curve: <ul style="list-style-type: none"> with 200 km/h: 705 m with 300 km/h: 1590 m with 400 km/h: 2825 m with 500 km/h: 4415 m Land Consumption: <ul style="list-style-type: none"> elevated: approx. 2,1 m²/m at-grade: approx. 12,0 m²/m Flexible alignment parameters with regard to gradients, curves, land consumption, route configuration Good possibilities to collocate with highways and railroads Noise emission(external) Same speed (200/300 km/h) of High Speed Rail and Transrapid: Transrapid has only half the noise of HS-Rail 			
		14 m ² /m	96 m ² /m

➡ The Transrapid fits well into the existing landscape / topography

➤ Safety

- Vehicle encloses the guideway (secure of derailment)

- Derailment

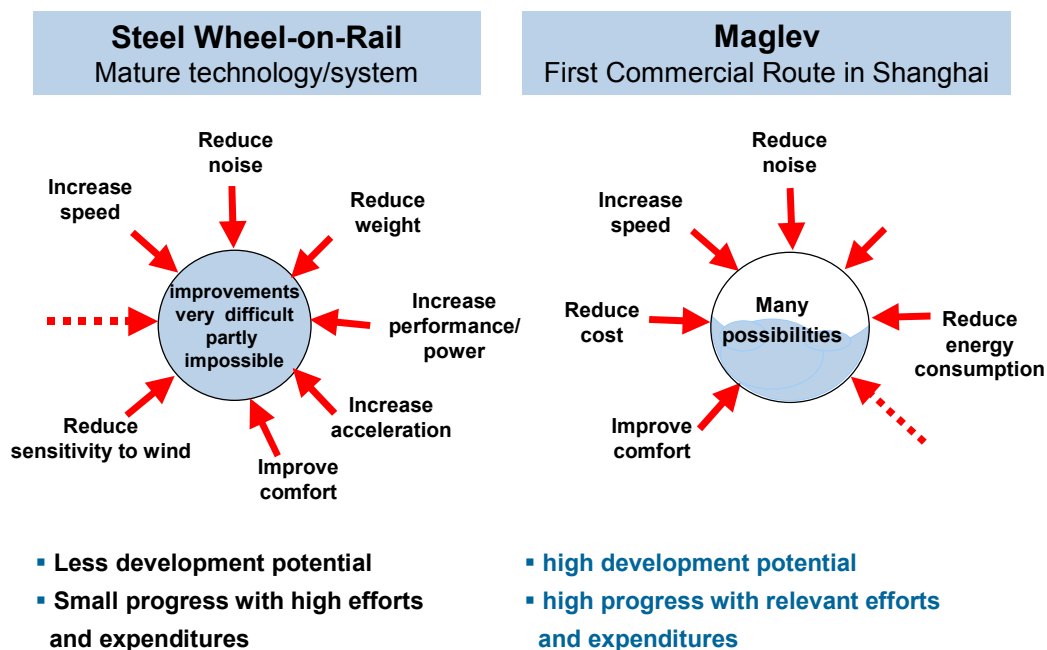


- Failure tolerant
- Failure transparent
- Full automatic system (human mistakes are excluded to the greatest possible extent)
- Current guideway inspections regarding geometrical deviations
- Cross winds: to a high degree insensitive

The Transrapid system, the magnetic levitation technology, is at his starting point in relation to the first commercial application in Shanghai. The system still has a great potential for further developments – both in technic and in economics!

For the near and the medium future the following program has to be handled:

- **Within the technic further development and optimisation of the overall and the subsystems:**
 - Guideway and guideway equipment
 - Vehicle
 - Propulsion and power supply
 - Operation control system
- **Economical optimisation / cost reduction for the**
 - Investment costs
 - Operation incl. maintenance costs



- **By means of:**
 - Further development by using new technical components and possibilities
 - Technical up-date by application of experience and knowledge gained
 - Use of components from other transportation and technical systems
 - Consistent application of the RAMS / LCC systematic
 - Standardization and simplification wherever possible

The People's Republic of China, a huge country which is on his way to one of the big industrial nations of the world, needs powerful, fast, extendable, future orientated transportation systems.



The People's Republic of China 中华人民共和国

- a huge country 一个非常大的国家
- the fastest developing industrial nation 发展最快的工业国家

The City of Shanghai 上海市

- a fascinating and fast growing world city

did decide to have the worldwide first application of the worldwide fastest ground transportation system!

一个迷人的增长迅速的世界城市作出了决定, 拥有全世界首次应用的世界上最快的陆路交通系统!

This great decision 这一伟大的决策

- well-considered 是深思熟虑的
- far-sighted 是有远见的
- courageous and determined 是有勇气和果断的
- will be for China and Shanghai most advantageous, will be rewarded, if – above all – the next decision will be made

下一个决定一旦作出, 它必将为中国和上海带来最大优势, 这一决定将得到回报

to start to build a backbone Transrapid net in China!

开始在中国建设磁悬浮交通干线网!

非常感谢您的倾听

