

Dispelling Ten Myths of Maglev

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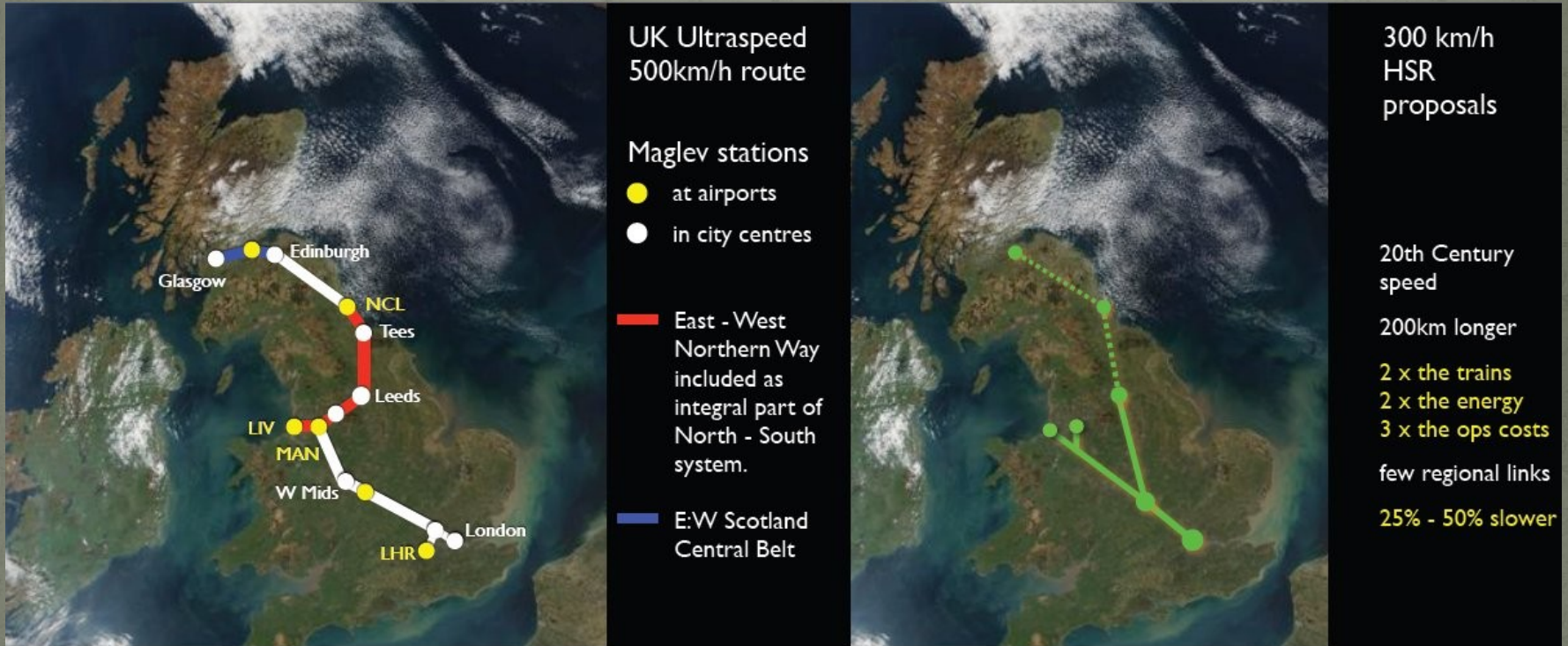
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Ten Myths of Maglev

1. Too expensive
2. Just another train
3. Replaces automobiles
4. Still experimental
5. Not safe or reliable
6. Can't carry freight
7. Can't do anything a train can't do
8. Incompatible with rail
9. Magnetic fields are harmful
10. It's noisy and "belches" CO₂

Myth No. 1 – Maglev's Too Expensive

- UK Ultraspeed analysis suggests otherwise



UK Ultraspeed

Does more: costs less

High Speed Rail

Does less: costs more

- Maglev and rail data from UK Ultraspeed website: www.500kmh.com

Myth No. 1 – Maglev's Too Expensive

- UK capital cost analysis suggests otherwise

High Speed 2 railway



330 km/h – 200 mph

Ugly trains, straining the limits of an outdated technology
Steel wheels grinding away at steel rails
Ugly overhead power



rail

Britain's biggest transport decision for decades

330 km/h 500

204 mph 311

330 0-200 mph (sec) 100

60 £m per km 30

25 land-take m² per m 2

UK Ultraspeed maglev



500 km/h – 311 mph

No wheels or friction: floats 1 cm above track on magnetic cushion
Elegant simplicity: all systems in minimally intrusive guideway



maglev

- Operating costs tell a similar story

Myth No. 1 – Maglev's Too Expensive

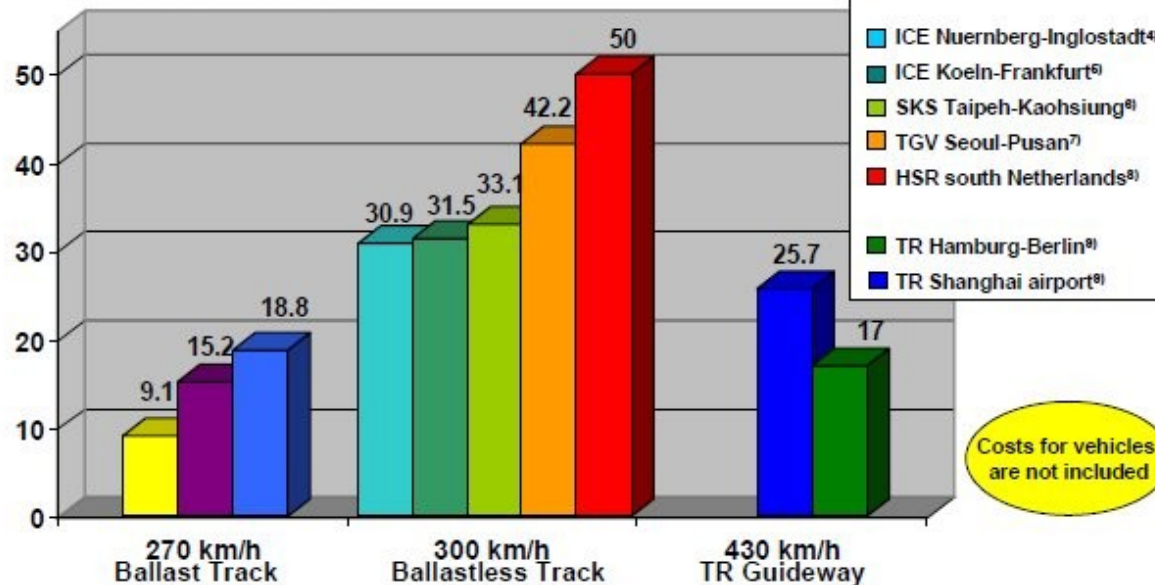
- Infrastructure cost comparisons are illuminating

SIEMENS

Shanghai Maglev Transrapid Technology

Infrastructure Costs

Million Euro/double track km



SOURCE: INFRASTRUCTURE OFFICE ORIGINALS

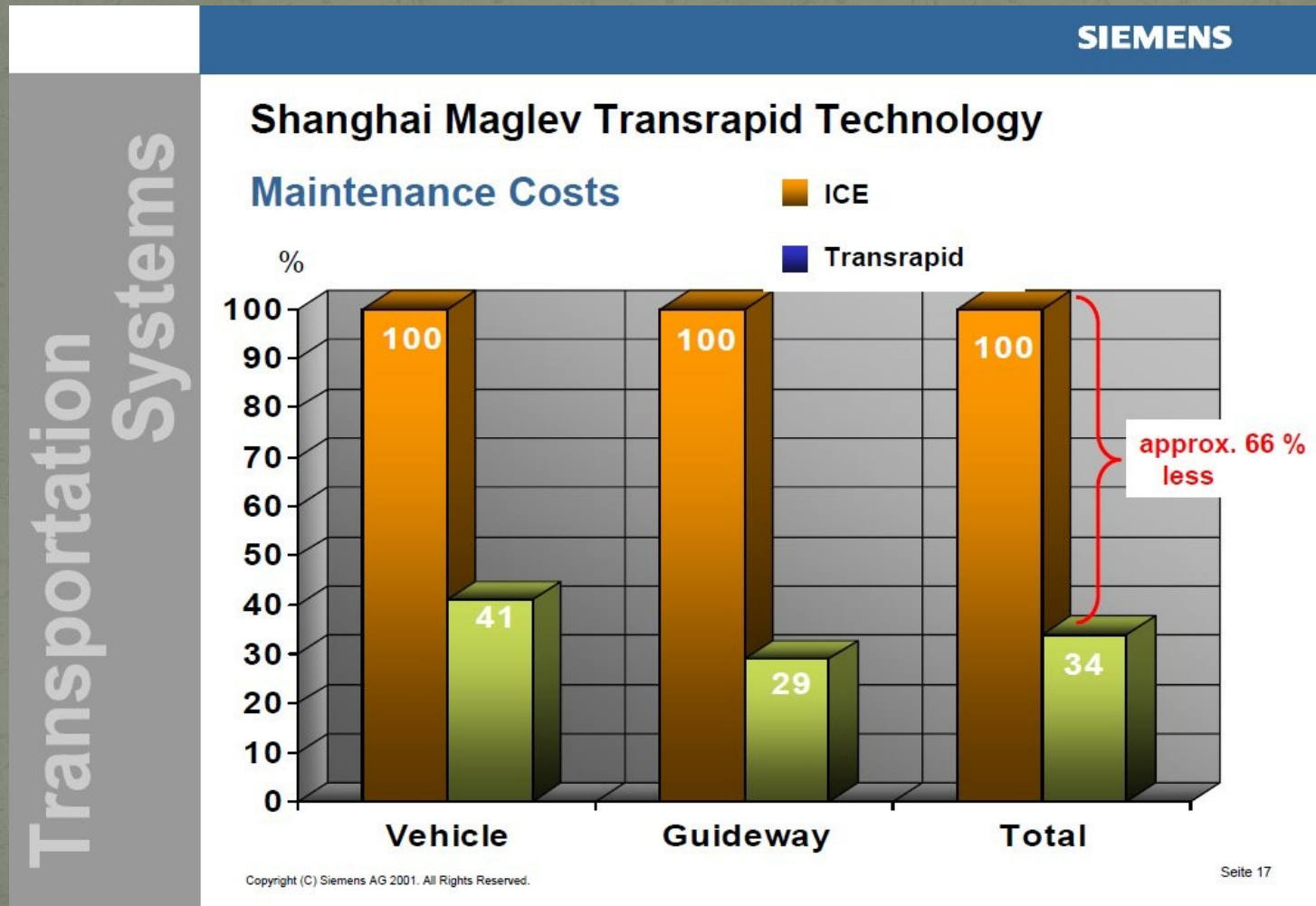
1) Average TGV older Lines include: Aquitaine, Auvergne, Bretagne, Est, Grand Sud, Interconnexion Sud, Transalpin, Limousin, Provence, Languedoc, Midi, Normandie, Picardie, Rheln-Rhone, (price level 2000); 2) TGV Mediterrane: PM 2/01 (price level 2000); 3) ICE av. diff. Line: Hannover-Wuerzburg and Mannheim-Stuttgart, Mittelstandsange (price level 1988); 4) ICE Nuernberg/Ingolstadt: Mittelstandsange/Boege (price level 2002); 5) ICE Koeln/Frankfurt: DB (price level 2002); 6) Shinkansen Taipeh/Kaohsiung: Rail Gazette 3/01 (price level 2000); 7) TGV Seoul/Pusan: VR 201/01 and www.thsrc.com.tw (price level 2001); 8) HSR Sud: HSR Consortium Netherland; 9) TR Lalson Office Shanghai and TRI Berlin (price level 2001)

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Myth No. 1 – Maglev's Too Expensive

- Maintenance cost comparisons favor maglev



Myth No. 2 – Maglev's Just Another Train

- Dictionary usage of “train” can be misleading
 - It's not “a line of railway cars coupled together and drawn by a locomotive,” but it's close to “a procession (of wagons, mules, camels or vehicles) traveling together in single file.”
- Maglev's more like an airplane without wings
 - Lightweight / aerospace materials, pressurized car bodies
 - Sleek, futuristic body shapes without overhead wires, etc.



Myth No. 3 – Maglev Will Replace Autos

- It'll never happen -- we love our cars too much
- Studies since 1989-1991 show this effect
- TRB's "In Pursuit of Speed" did good work

Assumptions

Air: 2.5 hr of access/egress and terminal time (1.25 hr at each end; cruise speed of 550 mph)

HSGT: 1 hr and 40 min of access/egress and terminal time; average speeds of 140 mph, 220 mph, and 300 mph as noted

Automobile: 15 min for parking and loading and unloading; average speed of 50 mph

Note: This figure is not intended to specify the actual boundaries of the HSGT travel market; such boundaries depend on many factors, only some of which are considered here. This figure illustrates how travel speeds of competing modes, together with assumptions about access times and average speeds, delimit their travel markets.

FIGURE 4-3 Illustrative relationships between trip time and distance.

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In Pursuit of Speed



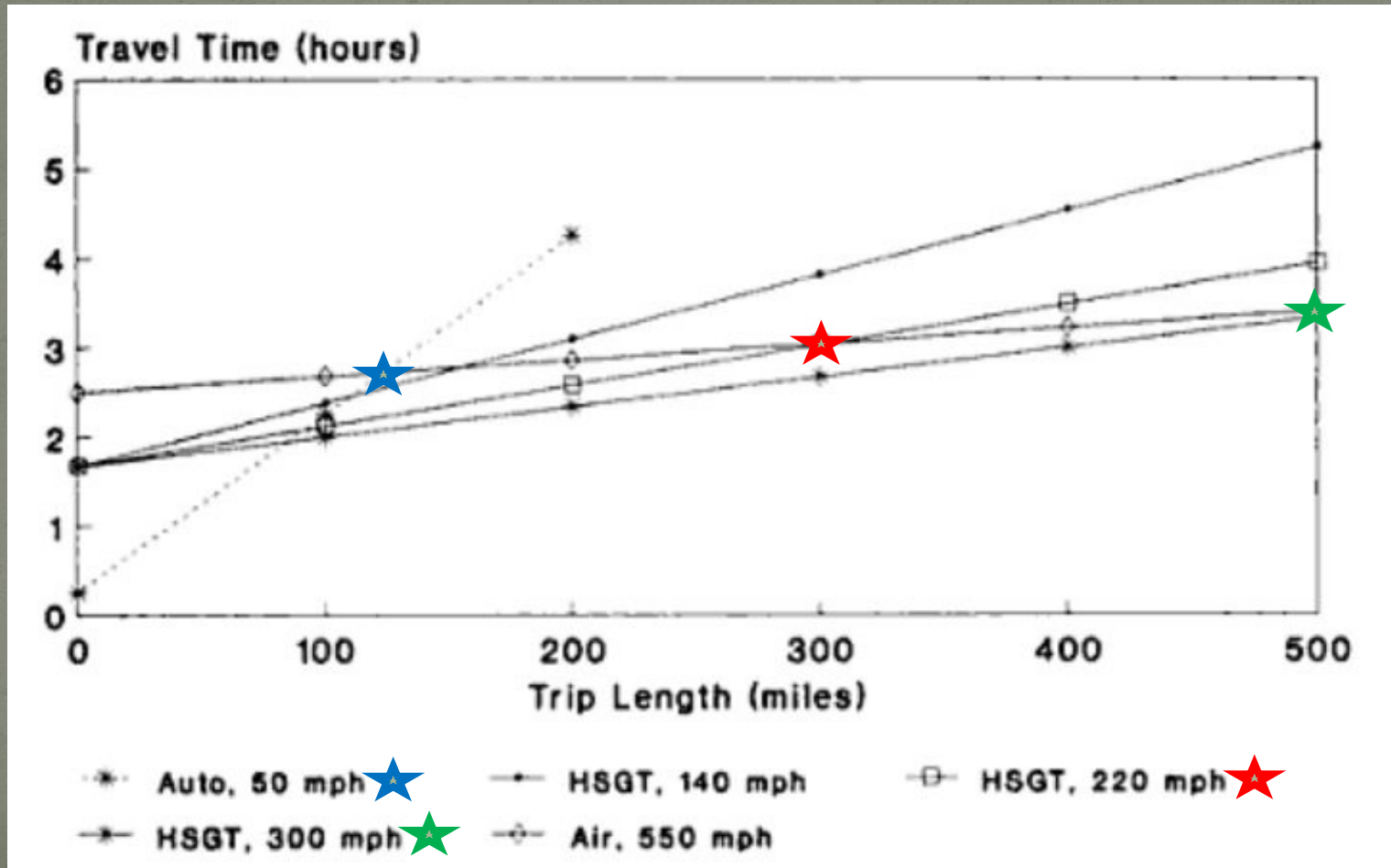
New Options for Intercity Passenger Transport



Transportation Research Board
National Research Council

Myth No. 3 – Maglev Will Replace Autos

- Maglev must always be faster than autos
- Real competition is the short-haul air market



Myth No. 4 – Maglev's Still Experimental

- Not a myth for many years, since maglev testing started in the 1970s, but:
 - 2001: Contracts signed for construction in China
 - 2003: Shanghai airport connector opens
 - 2009: 210,000 one-way trips taken since 2004



Myth No. 4 – Maglev's Still Experimental

- Not a myth for many years, and now:
 - 2007: Japan announces plans to commercialize its high-speed superconducting maglev, the “Chuo Shinkansen”
 - 2009: Japan government concurs that the technology is ready for revenue service starting in 2025
 - Will connect Tokyo and Nagoya at first (290 km/180 mi)
 - Osaka area extension to follow (260 km/160 mi)



Myth No. 5 – Maglev's Not Safe or Reliable

- Full-scale test tracks have been operating since the early 1980s
 - 560,000 passengers over more than 1.8 M km / 1.1 M miles
- Shanghai riders: 23 Million+ (2004 - 2009), travelling more than 3.9 million miles
- Commercial on-time reliability: 98.98%
- No injury accidents in normal operations*



Myth No. 6 – Maglev Can't Carry Freight

- Air shipping:



- Per section: 19 U.S. tons capacity
- Up to 20 section consists: 380 tons ea.
- Running speeds: > 400 km/h (250 mph)

- Seaborne shipping:

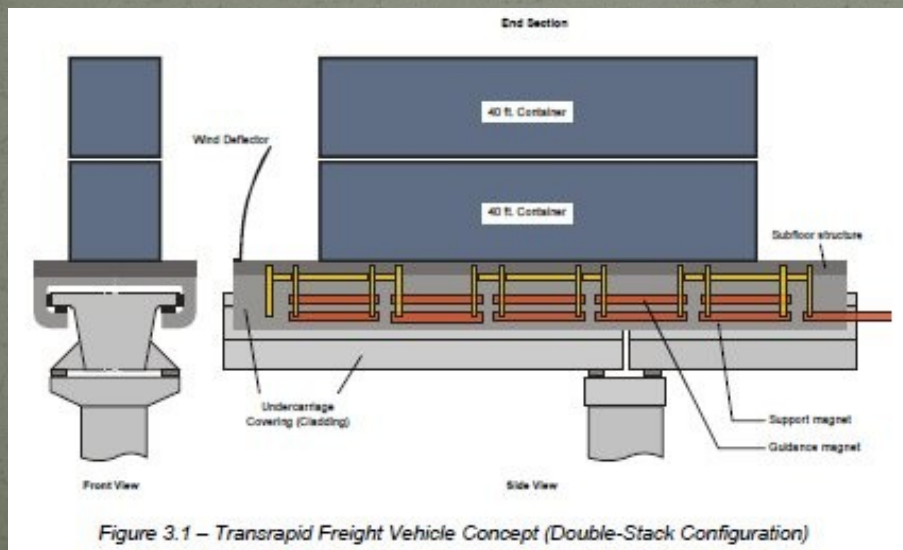


Figure 3.1 – Transrapid Freight Vehicle Concept (Double-Stack Configuration)

- Single- or double-stack
- Up to 20 sections: 20 – 40 units
- 400 – 800 containers / hour
- Running speeds: > 160km/h (100 mph)

Myth No. 7 – Can't Do Anything a Train Can't



- TGV record speed: 574 km/h (357 mph)
- Total track: 150 km (93 mi)
- SCMaglev record speed: 581 km/h (361 mph)
- Total track: 18.4 km (11.4 mi)
- Transrapid record speed: 501 km/h (311 mph)
- Transrapid *daily* speed: 430 km/h (267 mph)
- Total track: 30 km (19 mi)

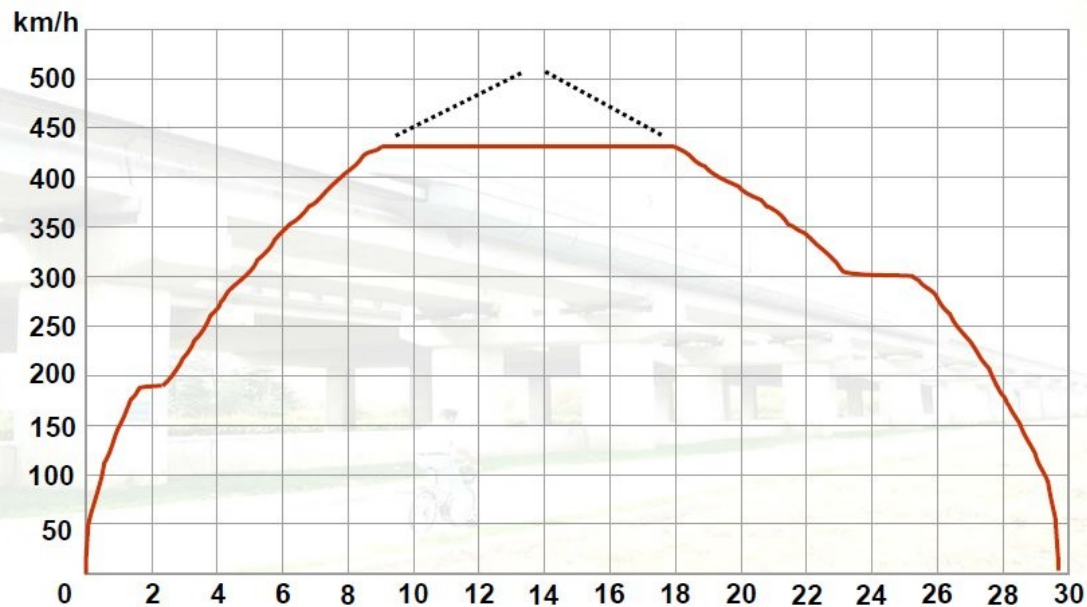
Maglev performance is out of HSR's reach

Myth No. 7 – Can't Do Anything a Train Can't

- Maglev performance is out of HSR's reach
 - Speed, acceleration, braking, banking, climbing: 3X

Shanghai Maglev Transrapid Technology

Speed Profile



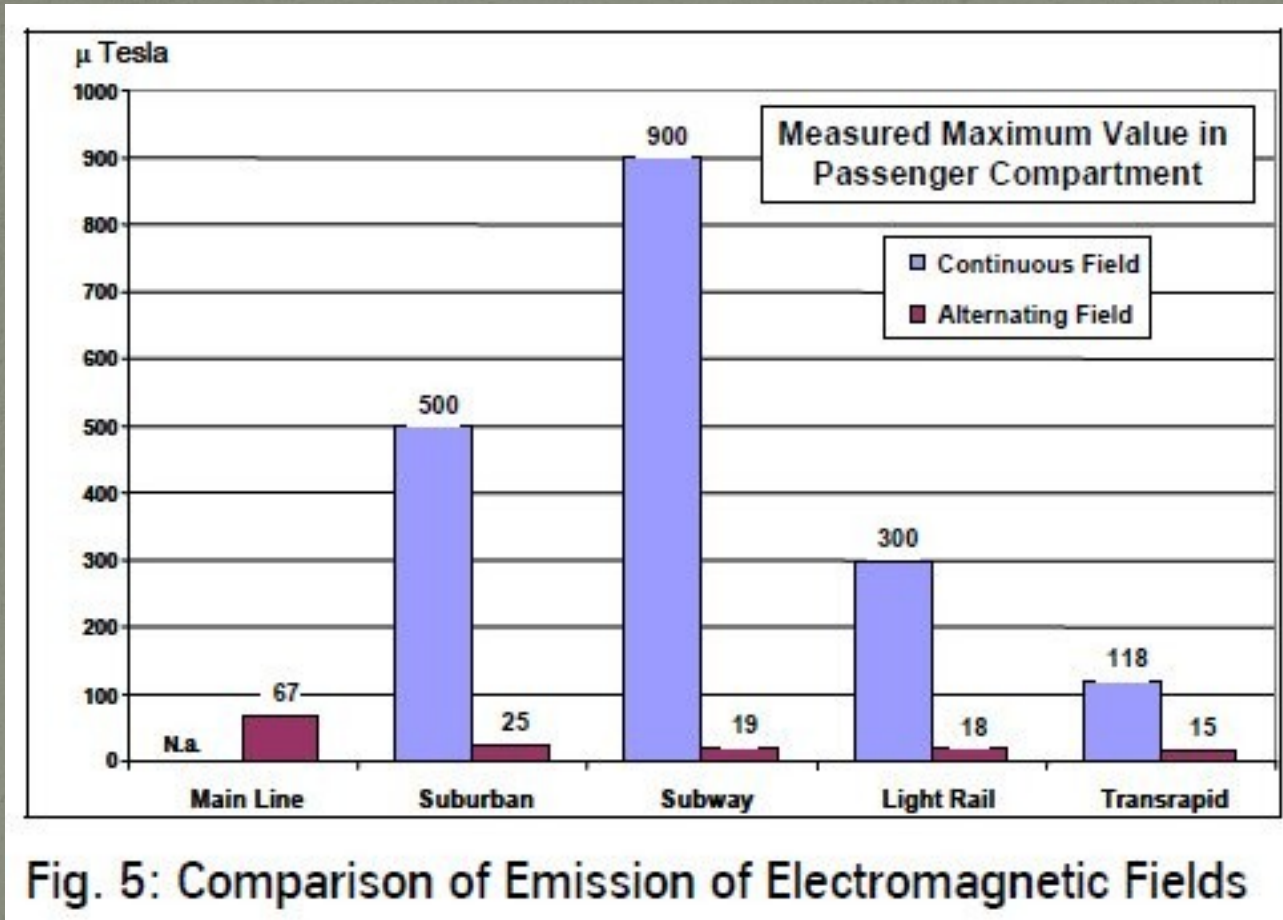
Myth No. 8 – Incompatible with Rail

- More true than not, considering different track shapes, materials and loads...and that's *good*
- Connections are made in stations, along with other modes (commuter rail, bus, taxi, subway, private cars or airplanes)
- Maglev runs only in sealed corridors



Myth No. 9 – Harmful Magnetic Fields

- Such a claim just makes no sense.



Source: German Federal Institute for Industrial Medicine

Myth No. 10 – Noise and CO₂

- Field test data taken by experts says otherwise

Table ES-1. Comparison of TR08 Sound Exposure Levels with those of other High-Speed Ground Transportation Systems

Speed [km/h (mph)]	SEL (dBA) at 30.5 m (100 ft)*						
	Maglev Technology					Wheel-on-Rail Technology	
	TR08				TR07	Acela	TGV
	reference concrete guideway	prototype concrete guideway	prototype steel guideway	hybrid beam	reference concrete guideway		
100 (62)	83	86	85	85	(NA)	(NA)	(NA)
150 (93)	81	82	84	85	80	87	88
200 (124)	86	87	88	85	83	92	92
240 (150)	(NA)	(NA)	(NA)	(NA)	85	94	93
300 (186)	93	94	95	92	90	(NA)	97
400 (249)	99	99	100	98	93	(NA)	(NA)

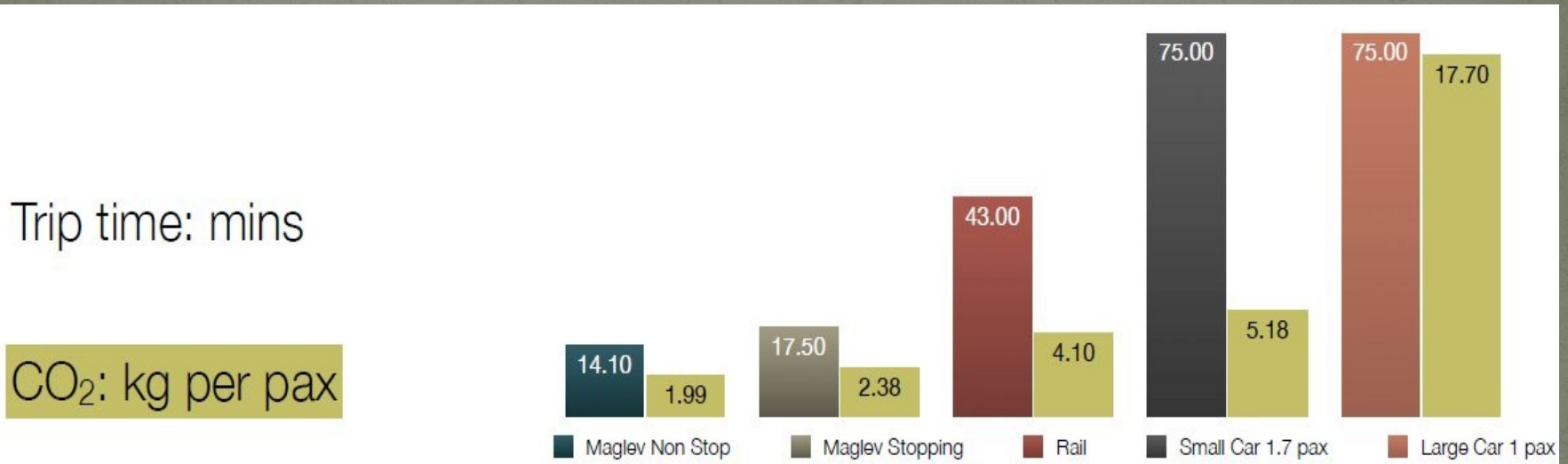
*Trains normalized to 225 m (740 ft) in length.

Notes:

- (1) +3dB difference = 2X perceived sound level
- (2) Source: “Noise Characteristics of the Transrapid TR08 Maglev System” DOT-VNTSC-FRA-02-13, July 2002

Myth No. 10 – Noise and CO₂

- UK Ultraspeed looked at CO₂ implications vs. trip times for Glasgow – Edinburgh route
 - 3 stations, 66.4 km/41.5 mi distance



- There's no "belching" of CO₂ going on...

Summary

- Many things you hear about maglev vs. high-speed rail simply aren't true, especially regarding:
 - Costs
 - Maturity
 - Environmental effects
- Rail is approaching its practical limits
- Maglev is poised to enter the U.S. market
- Maglev is a viable high-speed travel alternative