Dispelling Ten Myths of Maglev

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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

- Operating costs tell a similar story

<table>
<thead>
<tr>
<th>High Speed 2 railway</th>
<th>Britain’s biggest transport decision for decades</th>
<th>UK Ultraspeed maglev</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>330 km/h</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>204 mph</td>
<td>311</td>
</tr>
<tr>
<td></td>
<td>330 0-200 mph (sec)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>60 £m per km</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>25 m² per m</td>
<td>2</td>
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</tbody>
</table>

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Ugly trains, straining the limits of an outdated technology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

maglev
Myth No. 1 – Maglev’s Too Expensive

- Infrastructure cost comparisons are illuminating
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

Alt: 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.
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
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*

*As of the latest data available.
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:**
  - 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
Maglev performance is out of HSR’s reach
- Speed, acceleration, braking, banking, climbing: 3X
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

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

<table>
<thead>
<tr>
<th>Speed  [km/h (mph)]</th>
<th>SEL (dBA) at 30.5 m (100 ft)*</th>
<th>Wheel-on-Rail Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maglev Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR08</td>
<td>TR07</td>
</tr>
<tr>
<td>reference concrete guideway</td>
<td>reference concrete guideway</td>
<td></td>
</tr>
<tr>
<td>prototype concrete guideway</td>
<td>prototype steel guideway</td>
<td></td>
</tr>
<tr>
<td>prototype steel guideway</td>
<td>hybrid beam</td>
<td></td>
</tr>
<tr>
<td>100 (62)</td>
<td>83</td>
<td>(NA)</td>
</tr>
<tr>
<td>150 (93)</td>
<td>81</td>
<td>(NA)</td>
</tr>
<tr>
<td>200 (124)</td>
<td>86</td>
<td>80</td>
</tr>
<tr>
<td>240 (150)</td>
<td>(NA)</td>
<td>87</td>
</tr>
<tr>
<td>300 (186)</td>
<td>93</td>
<td>82</td>
</tr>
<tr>
<td>400 (249)</td>
<td>99</td>
<td>92</td>
</tr>
</tbody>
</table>

*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