MAGLEV TRAIN

Maglev trains reduce pollution and increase both speed and efficiency when compared to other modes of transportation . It is a proven technology and becoming a feasible technically and financially. Recent innovations in maglev technology , such as the indutrack system , promise ‘fail-proof’ operation Maglev trains do not create any pollutants themselves .High-speed transportation patents were granted to various inventors throughout the world.Early United States patents for a linear motor propelled train were awarded to German inventor Alfred Zehden. The inventor was awarded U.S. Patent 782,312 (14 February 1905) and U.S. Patent RE12,700 (21 August 1907).In 1907, another early electromagnetic transportation system was developed by F. S. Smith.A series of German patents for magnetic levitation trains propelled by linear motors were awarded to Hermann Kemper between 1937 and 1941.An early maglev train was described in U.S. Patent 3,158,765, "Magnetic system of transportation", by G. R. Polgreen (25 August 1959). The first use of "maglev" in a United States patent was in "Magnetic levitation guidance system"by Canadian Patents and Development Limited.

New York, United States, 1913

Emile Bachelet, of Mount Vernon, N. Y., demonstrated a prototype of a magnetic levitating railway car.

New York, United States, 1968

In 1968, while delayed in traffic on the Throgs Neck Bridge, James Powell, a researcher at Brookhaven National Laboratory (BNL), thought of using magnetically levitated transportation. [13] Powell and BNL colleague Gordon Danby worked out a MagLev concept using static magnets mounted on a moving vehicle to induce electrodynamic lifting and stabilizing forces in specially shaped loops, such ason a guideway.

Hamburg, Germany, 1979

Transrapid 05 was the first maglev train with longstator propulsion licensed for passenger transportation. In 1979, a 908 m track was opened in Hamburg for the firstInternational Transportation Exhibition (IVA 79). Interest was sufficient that operations were extended three months after the exhibition finished, having carried more than 50,000 passengers. It was reassembled in Kassel in 1980.

Birmingham, United Kingdom, 1984–95

The Birmingham International Maglev shuttle

The world's first commercial maglev system was a low-speed maglev shuttle that ran between the airport terminal of Birmingham International Airport and the nearby Birmingham International railway station between 1984 and 1995.its track length was 600 metres (2,000 ft), and trains levitated at an altitude of 15 millimetres (0.59 in), levitated by electromagnets, and propelled with linear induction motors.It operated for nearly eleven years, but obsolescence problems with the electronic systems made it progressively unreliable as years passed. One of the original cars is now on display at Railworld in Peterborough, together with theRTV31 hover train vehicle. Another is on display at the National Railway Museum in York.

Several favourable conditions existed when the link was built:

•The British Rail Research vehicle was 3 tonnes and extension to the 8 tonne vehicle was easy.

•Electrical power was available.

•The airport and rail buildings were suitable for terminal platforms.

•Only one crossing over a public road was required and no steep gradients were involved.

•Land was owned by the railway or airport.

•Local industries and councils were supportive.

•Some government finance was provided and because of sharing work, the cost per organization was low.

After the system closed in 1995, the original guideway lay dormantuntil 2003, when a replacement cable-hauled, the AirRail Link Cable Liner people mover was opened.

Emsland, Germany, 1984–2012

Transrapid at the Emsland test facility

Main article: Emsland test facility

Transrapid, a German maglev company, had a test track in Emsland with a total length of 31.5 kilometres (19.6 mi). The single-track line ran between Dörpen and Lathen with turning loops at each end. The trains regularly ran at up to 420 kilometres per hour (260 mph). Paying passengers were carried as part of the testing process. The construction of the test facility began in 1980 and finished in 1984. In 2006, the Lathen maglev train accident occurred killing 23 people, found to have been caused by human error in implementing safety checks. From 2006 no passengers were carried. At the end of 2011 the operation licence expired and was not renewed, and in early 2012 demolition permission was given for its facilities, including the track and factory.

Japan, 1969–present

See also: Chūō Shinkansen

JNR ML500 at a test track inMiyazaki, Japan, on 21 December 1979 travelled at 517 km/h (321 mph), authorized by Guinness World Records.

Japan operates two independently developed maglev trains. One is HSST (and its descendant, the Linimo line) by Japan Airlinesand the other, which is more well-known, is SCMaglev by the Central Japan Railway Company.

The development of the latter started in 1969. Miyazaki test track regularly hit 517 km/h (321 mph) by 1979. After an accident that destroyed the train, a new design was selected. In Okazaki, Japan (1987), the SCMaglev took a test ride at the Okazaki exhibition. Tests through the 1980s continued in Miyazaki before transferring to a far larger test track, 20 km (12 mi) long, in Yamanashi in 1997.

Development of HSST started in 1974, based on technologies introduced from Germany. In Tsukuba, Japan (1985), the HSST-03 (Linimo) became popular in spite of its 30 km/h (19 mph) at the Tsukuba World Exposition. In Saitama, Japan (1988), the HSST-04-1 was revealed at the Saitama exhibition performed in Kumagaya. Its fastest recorded speed was 300 km/h (190 mph).

Vancouver, Canada and Hamburg, Germany, 1986–88

HSST-03 at Okazaki Minami Park

Main article: High Speed Surface Transport

In Vancouver, Canada, the HSST-03 by **HSST Development Corporation** (Japan Airlines and Sumitomo Corporation) was exhibited atExpo 86 and ran on a 400-metre (0.25 mi) test track that provided guests with a ride in a single car along a short section of track at the fairgrounds. It was removed after the fair and debut at the Aoi Expo in 1987 and now on static display at Okazaki Minami Park.

In Hamburg, Germany, the TR-07 was exhibited at the international traffic exhibition (IVA88) in 1988.

Berlin, Germany, 1989–91

Main article: M-Bahn

In West Berlin, the M-Bahn was built in the late 1980s. It was a driverless maglev system with a 1.6 km (0.99 mi) track connecting three stations. Testing with passenger traffic started in August 1989, and regular operation started in July 1991. Although the line largely followed a new elevated alignment, it terminated at Gleisdreieck U-Bahn station, where it took over an unused platform for a line that formerly ran to East Berlin. After the fall of the Berlin Wall, plans were set in motion to reconnect this line (today's U2). Deconstruction of the M-Bahn line began only two months after regular service began. It was called the Pundai project and was completed in February 1992.

South Korea, 1993–present

Main article: Incheon Airport Maglev

Korea's Incheon Airport Maglev, the world's fourth commercially operating maglev.

In 1993, Korea completed the development of its own maglev train, shown off at the Taejŏn Expo '93, which was developed further into a full-fledged maglev capable of travelling up to 110 km/h in 2006. This final model was incorporated in the Incheon Airport Maglevwhich opened on February 3, 2016, making Korea the world's fourth country to operate its own self-developed maglev after the United Kingdom's Birmingham International Airport, Germany's Berlin M-Bahn, and Japan's Linimo.It links Incheon International Airport to the Yongyu Station and Leisure Complex while crossing Yeongjong island.It offers a transfer to the Seoul Metropolitan Subway at AREX's Incheon International Airport Station and is offered free of charge to anyone to ride, operating between 9am and 6pm every 15 minutes. Operating hours are to be raised in the future.

The maglev system was co-developed by the Korea Institute of Machinery and Materials (KIMM) and Hyundai Rotem.It is 6.1 kilometres (3.8 mi) long, with six stations and a 110 km/h (68 mph) operating speed.

Two more stages are planned of 9.7 km and 37.4 km. Once completed it will become a circular line.

Hyundai Rotem is exporting its Maglev technology to Russia's Leningrad MagLev System, the first overseas customer who will be getting the first urban commuter Maglev system in Europe.