Shanghai Maglev Project Update

The first commercial application of a high-speed magnetic levitation (maglev) train continues successful operation in Shanghai, China. The 19-mile system with operating speeds of 270 miles per hour has been in revenue service seven days per week since early 2004. Final acceptance of the system was achieved in April 2004, officially ending the system commission period. In total, the Transrapid system in Shanghai has carried over 10.4 million paying passengers, traveled over 2.2 million miles, and achieved an average on-time reliability of 99.98 in daily revenue operation.

Planning is ongoing in China for a phased extension of the Shanghai Airport Connection, in Phase I to the site of the 2010 World Expo, the Shanghai South Railway Station and the domestic Airport, and in Phase II on to Hangzhou, a large tourist city about 100 miles southwest of Shanghai.

The completion of the Shanghai Project, its upcoming extension and the plans to install Transrapid in the project in Munich, Germany continue to present a clear indication that this high-tech transportation technology is fully developed and mature for deployment in the U.S.

Background / Current Activities

- The Project was built as the First Maglev System in the world for commercial use
- The construction time was extremely short – contract award to the German technology companies in January 2001, VIP/Maiden Trip on December 31, 2002
- The project was a prestige, technology, and demonstration project in China, that needed to be completed prior to Premier Zhou Rongji leaving office.
- Investment cost was relatively high due to:
  - First installation
  - Challenging construction schedule
  - Primary maglev components all imported from Germany (vehicles, propulsion, control)
  - Steep learning curve for Chinese engineers
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- Entire guideway elevated (double track), construction in an urban/suburban landscape, medium level earthquake zone, poor soil conditions (river delta)
- Lead to a total cost of $1.2 billion for the 19 mile system

- Route extension to be completed in two phases:
  - Urban extension (21 miles) will connect current route with World Expo site, Shanghai South Rail Station, and Hongqiao Airport (domestic)
  - Hangzhou extension (97 miles) will connect Shanghai South Rail Station with the City of Hangzhou, southwest of Shanghai

- Final contract negotiations for the extensions between China and technology companies are ongoing (contract award expected in Summer 2007)

- Extensions to be built at a 30% reduced capital cost of $40 million per (double track) mile due to:
  - Higher local content based upon technology transfer from Germany to China
  - Guideway infrastructure is optimized to provide for better and lower cost design
  - Experienced Chinese workforce
  - Longer route allows investment costs to amortized over larger quantities

Operation and Maintenance

The Shanghai Maglev Project is owned, operated, and maintained by the Chinese company formed to realize the project, SMTDC. The maglev route is currently operating at 15 minute intervals, 15 hours/day, 7 days/week with maintenance/repairs scheduled during the night hours. Two 5-section vehicles are in operation to handle the 108 trips/day, with a third vehicle as reserve.

According to SMTDC and public information, currently 19% of the total staff are involved in administration, operation, and support services and 81% in maintenance and related activities. SMTDC provides all administration and operations personnel directly and subcontracts the system maintenance and support personnel (train and station attendants, ticketing, cleaning, security, etc.) to external companies.

With the extremely low wage levels in China, Chinese companies typically employ far more personnel than comparable operations in western countries. Even with substantially more personnel than a comparable US maglev project would employ, the total personnel costs only account for about 1/3 of the overall operating budget.
With the route’s short trip time (7.5 minutes) and high speed (267 mph), energy consumption is disproportionately high compared with longer routes. As part of the Shanghai public transportation network, the route receives a reduced electricity rate, but energy consumption still accounts for about 2/3 of the overall budget.

**Economic Viability**

Due to the original construction time and cost constraints on the Shanghai Maglev Project, the Shanghai city station is located in the financial district atop a subway station and not downtown (requiring a tunnel under the river). The route therefore has more of a demonstration than a transportation character in the Shanghai public transport network. Only after the urban extension to the Shanghai South rail station and domestic airport will the route take on a true transportation function. Despite this, ridership has been growing by over 30% per year, with nearly 4 million people riding in 2006.

Even under these circumstances, the project is economically viable. Using the current average fare levels, the ridership volumes in both 2005 and 2006 have been sufficient to cover the overall operations budget, as depicted in the previous sections.

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