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### **Is a 16-Mile HSR Tunnel Connecting Palmdale to Burbank Possible?**

*Long-distance rail tunnels being built around the world may hold lessons for California.*

San Jose, Calif., March 15, 2016 – The impending construction of California’s High Speed Rail (HSR) project has the Rail Authority carefully weighing alternatives for various segments of the high speed rail system. One problem that has stood out has been that of connecting Palmdale with Burbank through the San Gabriel Mountains. Various routes have been proposed, and the length of the proposed tunnel may be as great as 16 miles. Jae-Ho Pyeon, PhD, conducted a desktop study for the [Mineta Transportation Institute](#) that compiled information from long tunnels worldwide, including a number that were engineered specifically for HSR trains. The study, [Trend Analysis of Long Tunnels Worldwide](#), created a database that breaks down attributes of successful tunnels around the world, discussing what the trends are for feasibility of long tunnels, the optimal configurations for HSR tunnels that cover significant distances, and what safety features best protect passengers and first responders in case of emergencies.

Dr. Pyeon explains that “With advances in tunneling technology, the many long tunnels in use around the world today hold valuable lessons for CHSR, particularly with respect to minimization of ground disturbance and improved passenger and operator safety.”

The key findings include:

- Five HSR tunnels of the same length as – or longer than – the proposed Palmdale-Burbank connection have been built, worldwide. Another six are in the planning or construction stages.
- HSR tunnels have been built that exceed 30 miles; a tunnel longer than 16 miles is considered feasible by world engineering standards.
- The double-tube, single-track configuration is becoming standard in most areas because it is considered the safest. These are normally connected by cross-passages that assist with maintenance, improve ventilation, and can be used for escape in the event of emergencies. Refuge areas are often included in long tunnels as an added safety precaution.
- Both tunnel boring machines (TBMs) and conventional tunneling methods (drilling and blasting) are popular for rail tunnel projects. Many projects combine the two techniques. TBM is used because of its higher advance rates, and conventional means are employed in terrains that feature difficult rocks, highly variable rocks conditions, and enhanced risks of water inflow under high pressure.
- Tunnel excavation spoil management is usually critical in reducing the environmental impact of tunnel construction.

#### **About the Author**

Jae-Ho Pyeon, PhD, is an Assistant Professor in the Department of Civil and Environmental Engineering at San José State University. Dr. Pyeon received his master’s and doctoral degrees in Civil and Coastal Engineering from the University of

Florida, and is currently a University Representative of the Transportation Research Board and a member of the Construction Research Council, Construction Institute, and American Society of Civil Engineers. He has published 22 peer-reviewed journal or conference papers over the last five years, and his research interests include seeking efficient ways to improve the highway construction planning and process, assessing uncertainty in construction, and developing decision support systems to assist project planners and managers.

#### **About the Mineta Transportation Institute**

The Mineta Transportation Institute (MTI) conducts research, education, and information and technology transfer, focusing on multimodal surface transportation policy and management issues, especially as they relate to transit. The Institute has been funded by Congress through the U.S. Department of Transportation's (DOT) Research and Innovative Technology Administration, by the California Legislature, through the Department of Transportation (Caltrans), and by other public and private grants and donations, including grants from the U.S. Department of Homeland Security. The Institute operates from the College of Business at San José State University. Visit MTI at [transweb.sjsu.edu](http://transweb.sjsu.edu).

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