



## Shanghai Metro, China

Shanghai is China's largest city with over 20 million people.

The Shanghai Metro is one of the newest and most rapidly growing transit systems in the world, with its first rail line opening in 1995. The Metro will grow from the existing 400 kilometres of subway and light rail lines adding new rail lines and extensions, stations and platforms, growing to 22 lines with a rail network 877 km long.

Expansion of the Metro has been necessary for Shanghai to meet increasing commuter demands. There are now over three million commuters per day, with the demand growing by 30% from 2007 to 2008 alone. In addition to practical concerns and World Expo 2010 being held in Shanghai, the Chinese government is keen to promote the city as the nation's commercial and financial hub and the standard for China's dramatic modernisation.

### Evans & Peck's role

Evans & Peck was employed by Swiss RE, one of the world's largest reinsurance companies, to provide risk management advice and services for Lines 2, 11, 12 and 13. This advice was used by Swiss RE to communicate identified risk areas and recommended risk mitigation measures to the project owner.

For Metro Line 2 (eastern extension) and Line 11, Evans & Peck completed risk surveys on the areas where construction had already commenced. Evans & Peck then conducted a risk workshop which included personnel from all areas of the project including project managers, technical specialists and key stakeholders. The workshop reviewed all the project risks and prioritised those that were considered the most extreme or catastrophic.

Some of the common risk areas were geotechnical risks, tunnel fire as well as flooding. All of the accumulated information, including prioritised risks and associated mitigation strategies were logged into a risk register.

The register allowed risk management to be tracked and for updates to be incorporated as the project progressed.

For Metro Line 12 and 13, Evans & Peck completes a quarterly review to assess current and the future risks during construction. This involves evaluating the current risks that contractors are facing, interviewing the key people within the contracting organisations, looking at the design, understanding the surrounding environment and making an assessment on how the future work might have an impact on the surrounding areas.

Our 'future risk' assessment often involves assessing buildings that are very close to the tunnel or when the tunnel goes under a river or close to significant heritage buildings.

Findings are presented in a workshop situation with representatives from Shanghai Shentong Company (Shentong), the Shanghai government agency responsible for the delivery of Shanghai Metro, and discussed with Shentong's technical experts.

This is followed by a comprehensive report detailing recommendations on how the identified risk items could be mitigated.

A follow up visit is also conducted to ensure that the agreed actions are being carried out by the contractors involved.

### FACTS AND FIGURES

Client: Swiss RE

Project value: Various

E&P involvement: 2007 - ongoing

### Results

The risk register developed by Evans & Peck was a bilingual database, written and accessible in both English and Mandarin. The Evans & Peck team also consisted of bilingual professionals who aided in presentations and report formulation.

The constant and frequent discussions with the local contractors about proper management of risks have raised awareness on the benefits of risk management. We have seen improvements made on various sites, and some risk management practices being carried out by contractors.

By developing and demonstrating the risk management process Evans & Peck has also provided the client and contractor with tools to continue this practice in the future.

As risk cannot be eliminated, Evans & Peck is helping identify, assess and manage risk during the tunnelling of major metro projects

