

Project Snapshot

Company: Parsons Brinckerhoff
Business: Provider of infrastructure services for the transport industry.
Project: To develop, test and implement novel cooling strategies for underground railways.

Building Services

The London Underground has never looked cooler

In 2005 the London Underground set up the 'Cooling the Tube Project' (CTP) to look for methods of reducing the temperatures on the railway. Infrastructure services provider, Parsons Brinckerhoff, won the bid for this project and teamed up with London South Bank University (LSBU) to establish ways of mitigating the extra heat to make journey times more comfortable for passengers.

"Unfortunately you can't simply drill a vent to cool the London Underground," KTP Associate Yew Ting explains. "The first rule of heat transfer says that heat and energy cannot be destroyed, only transferred." This poses a considerable challenge for Parsons Brinckerhoff (PB), but with a Knowledge Transfer Partnership (KTP) project at LSBU new models have been developed in a first time approach to cooling the London Underground, despite space restrictions.

KTP Associates Yew Ting and Jolyon Thompson are developing tried and tested technologies, using pioneering new research and analysis methods to try and mitigate the excess heat. Jolyon's expertise lay in analytical heat transfer and so he looked into the modelling software available to the London Underground. He compared the best tools on the market to decide which were the most robust and most suitable products for the project. In carrying out this research Jolyon has developed some supplementary

additional analysis in Hybrid Cooling, an energy storage system whereby heat is captured from the air conditioning systems and dissipated above ground. "Jolyon has made a significant impact on the way we understand energy and the way we use it," commented Mark Gilby, KTP company Supervisor.

Ting was working on a more focused piece of work that involved using cooling pipes in tunnels, a process that has been used successfully in other major tunnelling systems such as the Channel Tunnel. Due to the limited space in the London Underground this process would be expensive and cause disruption due to having to close the railways down at night to install the pipes. Ting has undertaken a lot of numerical analysis to understand the heat transfer around cooling pipes. "As a result of Ting's work we have a real appreciation of what a cooling pipe would look like, how good a product it needs to be and how we can apply it to the London Underground," explains Mark.

Jolyon and Ting's work produced a number of important publications on the hybrid cooling process and on ground source heat transfer. They have attended the international symposium on 'Aerodynamics and Ventilation of Vehicle Tunnels' where they both presented papers. This work has increased PB's reputation in a field that is becoming increasingly popular.

LSBU Professors Graeme Maidment and John Missenden have provided their expertise in thermal engineering to this project. "Both academics have been very supportive of the

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Associates and have shared their technical ideas, helping them understand the different approaches to cooling systems which has certainly paid off in terms of technical output" said said Mark.

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