

## Research & Technology

We continued to focus our research on environmentally friendly technology, such as further development of low noise road surfacing, incorporation of recycled materials into our road pavement, adoption of common utility enclosure to reduce road opening, and improvement in information technology to enhance efficiency and reduce paper wastage.



## Low Noise Road Surfacing (LNRS)

Our research on a more durable LNRS continued. The trial of a new type of polymer modified friction course at Chui Tin Street, a local road in Shatin, continued. After 21 months of laying, the best performing trial section still has a noise reduction of 2.5 dB(A) when compared with the original bituminous surfacing. This showed a significant improvement over previous LNRS trials. With a view to benchmarking the noise reduction effect of various types of friction courses on an expressway, trial sections of five different types of friction courses, including the new polymer modified friction course, were laid at the Fanling Highway in September 2007.



Trial of LNRS at Fanling Highway

The traffic noise performances of the sections were measured both before the trial, and after the new friction courses were laid. Noise measurements are regularly carried out by the Hong Kong Polytechnic University, which uses both the roadside measurement method and the close-proximity method to measure the noise level. In addition, the hydraulic conductivity of the sections are also measured. The monitoring period will last for two years and the findings will provide us with more comprehensive noise performance data of the various types of friction courses at high traffic speed.



Drainability Test - for measuring hydraulic conductivity

Close Proximity Method (CPX) - for measuring road/tyre noise level



## Recycled Pavement Materials

### Recycled Aggregates as Sub-base

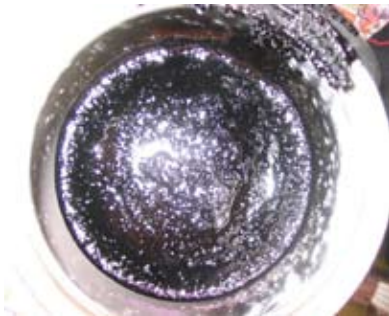
Monitoring on the performance of the recycled aggregates used as sub-base in Fo Tan Road continued in 2007. The trial sections of footpath and carriageway using recycled aggregates as sub-base continued to perform satisfactorily. The carriageway pavement constructed with full depth recycled sub-base, composite sub-base and virgin sub-base shown no difference in actual site performance so far. However, it was noted that significant cementation has taken place in the recycled sub-base layer. Long term monitoring is required to assess whether reflective cracking in the asphalt pavement will result from cracking of the cemented sub-base. The footpath with recycled sub-base also showed no difference in actual site performance. The recycled sub-base can be easily excavated with hand tools, and the cementation effect does not affect the ease of excavation. A technical report will be written on the findings of the site trial.

### Recycled Aggregates in Precast Concrete Pavers

We have introduced the use of precast concrete pavers made with recycled aggregates since April 2003. Two local manufacturers are now producing such pavers and these are being used on our footpaths. Besides, these pavers are also used in public building projects by Housing Department and Architectural Services Department, and in private developments.

### Study on Asphalt Rubber (AR)

AR is a term used to describe asphalt binder incorporating crumb rubber recycled from waste tyres. AR mixture means the asphalt mixture produced with AR and aggregates. Overseas researches and experiences indicate that using AR mixtures for pavement can improve durability, decrease traffic noise, reduce pavement layer thickness, and relieve the burden of disposing waste tyres in landfills. In June 2007, we commissioned the Hong Kong Polytechnic University to study the performance of AR mixtures produced from local materials. The study includes conducting a literature review on the use of AR overseas, and evaluating the properties and performance of locally produced crumb rubber fines, AR and AR mixtures. The laboratory tests on the properties of crumb rubber fines have been completed, and the other tests are in progress.



Bitumen with  
Asphalt Rubber

### Common Utility Enclosure (CUE)

We have implemented two small scale CUEs to gain experience on the technical and administrative aspects. One is located at Horizon Drive at its junction with Chung Hom Kok Road in Hong Kong. The other one is located at Yan Cheung Road in Kowloon. A cross road culvert type of CUE design is adopted, providing room for power and telecommunication cables. We are currently liaising with Lands Department and the interested utility undertakings to enter into Supplemental Agreements to their block licences on the use of the CUEs for laying their services.



### Development of the Excavation Permit Management System (XPMS)

Highways Department is using the Utility Management System (UMS) developed in 1997 to process excavation permit applications under the Land (Miscellaneous Provisions) Ordinance. In September 2002, a web-based system known as the Internet Interface to Utility Management System (IIUMS) was rolled out to enable both the applicants and the relevant controlling departments, including Transport Department and Hong Kong Police Force, to process the application via the Internet. The data in the UMS and the IIUMS are synchronized twice a day, necessitating temporary disruptions to service and data replication. In April 2004, an enhancement on both systems was carried out to cope with the business changes brought about by the amendments to the Land (Miscellaneous Provisions) Ordinance to effect fee charging and tightening control of road excavation.

In 2006, Office of the Government Chief Information Officer (OGCIO) assisted Highways Department to study the redevelopment of the UMS/IIUMS to take advantage of the latest development in information technology and to further improve the efficiency of excavation permit processing. The study recommended the future system (XPMS) to be a single web based system, eliminating the need for data replication and maintenance of two existing separate systems, and will greatly reduce paper copies. The XPMS will also facilitate electronic data submissions and dissemination, greatly reducing paper copies. The system analysis and design stage of the XPMS has been completed and the system implementation and integration stage is in progress. It is expected that the XPMS will phase out the UMS/IIUMS by mid-2009, enhancing the efficiency, transparency and user-friendliness of excavation permit management.

