

**For discussion**

**1 March 2012**

**Legislative Council Panel on Transport**

**Trial use of Thermal Patcher for Small Scale Resurfacing  
of Bituminous Pavement**

**Purpose**

This paper briefs Members on the process and results on the trial use of thermal patcher for small scale resurfacing of bituminous pavements.

**Background**

2. Among over 2,000 km of road network in Hong Kong, about three quarters are paved with bituminous materials. In order to maintain the riding quality of road pavements at a satisfactory level throughout their design life, Highways Department arranges appropriate repair and rehabilitation works according to the extent of deterioration of the pavement. “Corrective maintenance work” that can be completed within a very short duration is normally carried out for dealing with small areas of road damage, such as local unevenness, potholes, etc. On the other hand, Highways Department plans larger scale preventive maintenance work according to the results of periodic detailed inspections. This type of maintenance work, classified as “planned maintenance work”, requires the use of larger size construction machinery and

is put under more stringent quality control.

3. Regardless of the scale of pavement maintenance works, traditional method deploys handheld breakers and cold milling machines to break up and remove damaged pavement materials, followed by laying of new bituminous materials and then compaction (see **Figures 1 and 2**). Such process inevitably generates a certain amount of construction noise. As a result, for road sections that are congested with traffic during daytime and noise-sensitive during night-time, there are practical constraints and different considerations for arrangement of maintenance works using the traditional method. This leads to a considerable period of planning lead time before works can be carried out. Therefore, using the thermal patcher may be more appropriate than using the traditional method.

### **Thermal Patcher**

4. Thermal patcher adopts an engineering principle known as hot-in-place recycling. Simply speaking, thermal patcher is a truck-mounted machine that equipment heats up and softens the existing bitumen in a defective area. The softened material is then mixed and compacted with an appropriate amount of new asphalt material to form a uniform and seamless repaired surface from the original pavement.

5. This technology promotes the re-use of existing bituminous materials to reduce the generation of construction waste, and reduces the construction noise when compared with the traditional method involving mechanical breaking processes. Similar recycling methods have also been used by different countries.

6. A few years ago, Highways Department commenced the trial on the use of small-size thermal patcher on “corrective maintenance work”, as an alternative option for corrective maintenance of bituminous pavements (see **Figure 3**). For road maintenance contracts commencing from 2009 onwards, Highways Department has stipulated the preferential use of thermal patcher to perform bituminous pavement repair works for an area not exceeding 2.5m<sup>2</sup>. Experiences in the past two years have revealed that the performance of the thermal patcher in pothole and unevenness repair works is satisfactory.

### **Process and Results of the Trial of Small Scale Resurfacing of Bituminous Pavement**

7. In order to further exploit the advantages of hot-in-place recycling, Highways Department took the initiative in exploring wider application of such technology in pavement preservation, and its feasibility in carrying out larger-scale “planned maintenance work”. A series of field trials on large-size thermal patcher (see **Figure 4**) were conducted in 2010 to ascertain the performance and effectiveness of its application under local working conditions, particularly on road sections subjecting to stringent environmental and traffic constraints. The trial covered various types of bituminous pavement structure and traffic conditions for roads locating in different districts of the urban and the New Territories areas.

8. From the detailed observations of the trial, Highways Department confirmed that the use of large-size thermal patcher for pavement resurfacing works on “planned maintenance work” was technically feasible. A section of 30 metres long carriageway lane could be repaired within a temporary lane

closure of 6 to 8 hours. The quality of the repaired road surface was comparable to that accomplished by the traditional method.

9. While the use of thermal patcher is more environmentally friendly, its productivity is however comparatively low. For this reason, this technology is limited to be used for small scale resurfacing of an area not exceeding 100 m<sup>2</sup>, and cannot totally replace the traditional method.

10. For road maintenance contracts commencing from 2011 onwards, Highways Department has included the provision on the use of large-scale thermal patcher as an alternative option for small scale resurfacing of bituminous pavements.

## **Way Forward**

11. To cope with the ever increasing demand on road maintenance and to alleviate the traffic and environmental impacts of its associated works, Highways Department will keep abreast of the developments of the latest technology and the thermal patcher, and identify room for improvements when carrying out road maintenance works.

**Highways Department**

**February 2012**



[Figure 1] Traditional repair method for bituminous pavements –  
Cold milling of defective materials



[Figure 2] Traditional repair method for bituminous pavements –  
Laying and compacting new bituminous materials



[Figure 3] Road maintenance workers are arranging localized repair by small-size thermal patcher



[Figure 4] Pavement resurfacing by large-size thermal patcher