

**Legislative Council
Panels on Environmental Affairs and Transport**

**Retrofitting Particulate Traps onto
Pre-Euro Diesel Light Vehicles**

This paper briefs Members on the findings of the trial of retrofitting pre-Euro diesel light vehicles (i.e. those weighing up to 4 tonnes) with particulate traps and our proposed way forward.

Background

2. The Chief Executive announced in his Policy Address in 1999 a number of proposed measures to reduce air pollution in Hong Kong. Among these, the Administration proposed, subject to the findings of a trial, to provide grants in 2001 to owners of pre-Euro diesel light vehicles (i.e., those manufactured before 1995) including taxis, light buses and small vans to install onto their vehicles particulate traps and to make the installation a pre-requisite for the annual renewal of their vehicle licence.

3. The Hong Kong Polytechnic University (HKPolyU) has developed a low cost particulate trap. The Environmental Protection Department, in collaboration with HKPolyU, started a trial of this product last year. The trial has now been completed. Based on the findings of the trial, we have worked out a proposal to retrofit particulate traps onto all pre-Euro diesel light vehicles.

The Trial of Particulate Traps

4. HKPolyU started its trial in August 1999. The trial was steered by a monitoring committee, the members of which comprised the participants of the trial, representatives from the transport trades, the Motor Traders Association, HKPolyU and relevant government departments.

5. The trial comprised 2 phases. The first phase was to evaluate the performance of the trap. As the trap requires regular cleaning, the second phase was to identify practicable options to dispose of the particulates trapped.

Phase 1 of the Trial

6. 62 diesel light vehicles including 21 taxis, 22 vans and 19 public light buses were retrofitted with the traps. These vehicles ran under their normal operating conditions for about four months. From time to time, these vehicles had to go back to HKPolyU to evaluate the effectiveness of the traps by measuring the smoke levels with and without the trap, and the particulates that the traps had collected. Some vehicles on trial were selected for the assessment of the effects of the traps on their vehicle engines by checking the engine back-pressure. The trial also included a survey of the opinions of the drivers on the use of the trap such as its effects on engine performance, fuel and motor oil consumption.

7. In addition, HKPolyU commissioned the National Engine Combustion Laboratory of the Tianjin University to conduct a comprehensive particulate emission test to assess the effectiveness of the trap in reducing the particulate emission of a vehicle. The test was done on an engine similar to that of our old vehicles.

Phase 2 of the Trial

8. HKPolyU has developed 2 cleaning methods for the trap. One of them is to clean it with a tailor-made cleaning machine. The other is to soak the trap in a container of water mixed with a small amount of detergent. The effluents from the cleaning operation will then be treated to a level allowed for disposal into foul sewers leading into Government sewage treatment plants. The main focus of phase 2 is on the effectiveness of the effluent treatment facilities.

9. 17 diesel light vehicles including 11 taxis and 6 vans participated in this part of the trial. These vehicles used either one of the two cleaning methods.

Findings of the Trial

10. The trial has confirmed the effectiveness of the trap developed by HKPolyU and the treatment methods of the effluent from cleaning of the traps to the target level as mentioned in paragraph 8. Key findings of the trial are:

- (a) The trap can reduce about 30% of the smoke emissions of a vehicle under a free acceleration smoke test.
- (b) On a comprehensive emission testing conducted by the Tianjin Univeristy, the trap can reduce up to 30% of the particulate emissions and to 36% in smoke emission.
- (c) The effects of the trap on the engine of a vehicle are insignificant.
- (d) There is overwhelming support for the trap from the participating drivers or vehicle owners. They have not found any adverse effect of the traps on engine performance or fuel and motor oil consumption of their vehicles.
- (e) The effluent treatment methods developed by the HKPolyU have been found effective and the participating drivers or vehicle owners are supportive of such methods.

Emission Benefits

11. About 64% of the local diesel light vehicle fleet are pre-Euro models. While some of the older diesel taxis will switch to LPG vehicles soon, many of the other diesel light vehicles still have 5 or more years to operate before retirement. It is expected that the traps can reduce at least 20% of the particulate emissions from the fleet of pre-Euro diesel light vehicles. This translates into a 6% reduction in total vehicle particulate emissions.

Implementation Proposal

12. The trial has confirmed that the particulate trap technology is practical under local circumstances. We intend to seek approval from the

Finance Committee on 12 May 2000 for funding to assist diesel light vehicle owners to retrofit their pre-Euro vehicles with traps. There are currently about 42,400 pre-Euro diesel vehicles of weight up to 4 tonnes. Given that the cost of a trap including installation is around \$1,200, we estimate that the funding required to retrofit all of these pre-Euro diesel light vehicles would be around \$50.9 million.

13. Subsequent to the launch of the trial of particulate traps, different designs of traps have been proposed by various suppliers. We will set up an independent technical committee comprising experts in this area to identify traps which could perform at least as well as that developed by HKPolyU.

14. It would not be efficient use of time and resources if the technical committee has to arrange a trial for each of these products. Our intention is to ask all interested proponents to provide to the committee sufficient information to demonstrate the efficacy of their products.

15. The evaluation will be part of a tendering process for selecting contractors to supply and retrofit traps onto the pre-Euro diesel light vehicles. We propose to award non-exclusive contracts to the tenderers whose products have passed the technical assessment conducted by the proposed technical committee. Our intention is that vehicle owners can choose to retrofit their vehicles with one of the products recommended by the proposed technical committee, and will be given the same amount of grant, which is equal to the lowest bid of the trap in the recommended list.

16. Subject to funding approval by the Finance Committee, we intend to proceed with the tendering in June and aim at completing the evaluation and awarding of the contracts by October this year. The actual retrofit programme is scheduled to start in December 2000 and will be completed by 2002. We plan to make the installation a pre-requisite for the renewal of licence for these pre-Euro diesel light vehicles one year after the grants are made available.

Environment and Food Bureau

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