



Road maintenance works safety is a growing safety concern and challenge to the industry. If in the absence of suitable and detailed planning, organisation and implementation, particularly in the absence of a safe system of work (including risk assessment, hazard identification of works, development, implementation and monitoring of the safety control measures), it may lead to unsafe conditions to road maintenance workers as well as other road users. The following safety measures on road maintenance works will help reduce risks to those working on roadways and other road users.

As Contractors and Employers:

General

- Strictly follow the requirements of Highways Department's "Code of Practice for the Lighting, Signing and Guarding of Road Works" (the Code).
- Erect relevant signs, road markings, barriers and road hazard warning lanterns with positions in compliance with the Code.
- Apply to the Highways Department for an expressway works permit for any road works on expressways.
- The traffic management devices must fulfil the standards described in Chapter 4 of the Code. All traffic signs and devices shall be maintained properly and cleaned regularly to ensure that they are clean, legible and in good working condition at all times. The surfaces of any traffic signs and reflective materials on any devices shall be smooth and free from creases. Any unsatisfactory signs or devices shall be replaced promptly.

Safe System of Works

- Appoint a competent person to conduct task-specific risk assessments in identifying all potential hazards including those related to road traffic and emergency situations, taking into account the nature of work, flow of traffic and movement of workers to-and-from the work area.
- Formulate safe work methods and procedures prior to the work with due regard to the results of risk assessments, and in line with relevant codes of practice and guidelines.

Warning Alert and Signal to Other Road Users

- As far as practicable, give advance warnings to alert road users about any emergency situations such as highway maintenance works (or road accidents ahead) through the display/ broadcasting systems.
- Adopt road diversion display and avoid arranging workers/ employees to physically guide vehicles as far as possible and ensure all workers/ employees who have to carry out their duties on roads are safe by position.
- Switch on the vehicle's hazard warning lights, the strobe lights and the flashing arrow sign of all the works vehicle(s) and the shadow vehicle to alert the oncoming vehicles to use other traffic lanes. In addition, drivers of the works vehicle(s) and the shadow vehicle shall pay attention to the road traffic at the back.



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Relevant Training and Personal Protective Equipment

- Provide all workers/ employees with adequate information, instruction and training and ensure that they are conversant with the safe work procedures and safety measures.
- Provide all workers/ employees involving works on expressways with personal protective equipment as necessary such as safety helmet and reflective jackets, and ensuring their proper use of the equipment.

Communication, Monitoring and Control System

- Equip all the works vehicle(s) and the shadow vehicle with communication facilities in order to maintain effective communication among all related personnel.
- Develop and implement an effective monitoring and control system to ensure that the above safety measures are strictly followed, such as conducting site safety inspections by site foremen and safety officers/ safety supervisors of contractors.

Other Practical Tips

- As far as practicable, use automated machinery for laying/ retrieval of traffic cones so as to reduce workers' exposure to oncoming traffic.
- As far as practicable, avoid the works to be conducted during peak traffic hours.
- Place plant, equipment and tools as far away as practicable from the moving vehicles.
- Arrange the operation to be performed with the workers/ employees concerned facing oncoming traffic as far as possible.
- Depending on the traffic density and road conditions, seek assistance from the Police when setting up or subsequently removing a lane closure if necessary.

As Road Maintenance Works Supervisors and Workers:

Safety Notes

- Check the works vehicle(s), the shadow vehicle, the strobe lights, the truck mounted attenuator, the flashing arrow sign, the high intensity battery operated beacons, the low intensity battery operated lamps and the telecommunication equipment to ensure that they can function properly.
- Maintain the buffer distances between the works vehicle(s) and the shadow vehicle(s) according to Table A-1 of the Code and stop at pre-determined locations.
- Pay attention to the traffic conditions when staying on works vehicle(s) and ensure that it is safe before getting off the works vehicle(s).
- Face the direction of the oncoming traffic and pay attention to the traffic conditions when erecting warning signs, road hazard warning lanterns and traffic cones.
- Must wear proper personal protection equipment such as safety helmets and reflective jackets.



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Road Maintenance Works on Expressways:

(i) The Use of Shadow Vehicle for Mobile Operations on Expressways

- When conducting mobile operations on expressways, shadow vehicles shall be used. Shadow vehicles must be equipped with suitable truck mounted attenuator, amber flashing beacons, flashing arrow signs and barricade signs. Please refer to Figure 1 for the equipment of a shadow vehicle. According to the speed limit of the road and mode of operation, the works vehicle and shadow vehicle need to maintain a proper buffer distance (Figure 2). The relevant requirement on buffer distance can be found in the Code.
- For road moving works at a bend or location with inadequate sightline distance, the shadow vehicle shall stay before the start of the bend or before the crest of a slope. The shadow vehicle shall also keep a distance of at most 100 metres from the works vehicle(s). When the length of a road section with inadequate sightline distance is longer than 100 metres, additional works vehicle(s) shall be provided between the shadow vehicle and the first works vehicle to prevent any vehicle bypassing the shadow vehicle from wedging-in the relevant road section inadvertently.
- Under the following circumstances, road mobile operation procedures on expressways shall not be carried out, except in emergencies:
 - (a) Work requiring works vehicle(s) to stop for more than 15 minutes;
 - (b) Inclement weather or poor visibility (such as dense fog); and
 - (c) Traffic flow is significantly affected.



Figure 1: A shadow vehicle

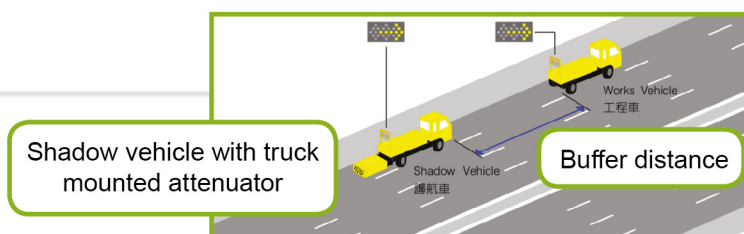


Figure 2: Works vehicle shall be escorted by a shadow vehicle



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(ii) Arrangements for Lane Closure on an Expressway

- The following figure shows the typical signs (including advance warning signs, cones and flashing arrow signs, etc.) to be used during lane closure on an expressway (see Figure 3), refer to Fig.B-1 to Fig.B-8 of the Code about the sign layouts for other lane closure on an expressway.
- The Code stipulates that, when carrying out maintenance works on expressways with lane closure, advance warning signs shall be displayed at least 600 metres in advance of the works area. Flashing arrow signs shall also be displayed where temporary diversion begins.
- The detailed display requirements of advance warning signs and cones can be found in the Code. A flashing arrow sign has a matrix of individual lights that can flash on and off in a predetermined manner to show signs such as “arrow to the right” or “arrow to the left”. When there are stationary or slowly-moving works vehicles on an expressway, it must be used to warn drivers to take special care. The mounting height of flashing arrow sign should not be less than 3.3 metres in order to provide advance warning.

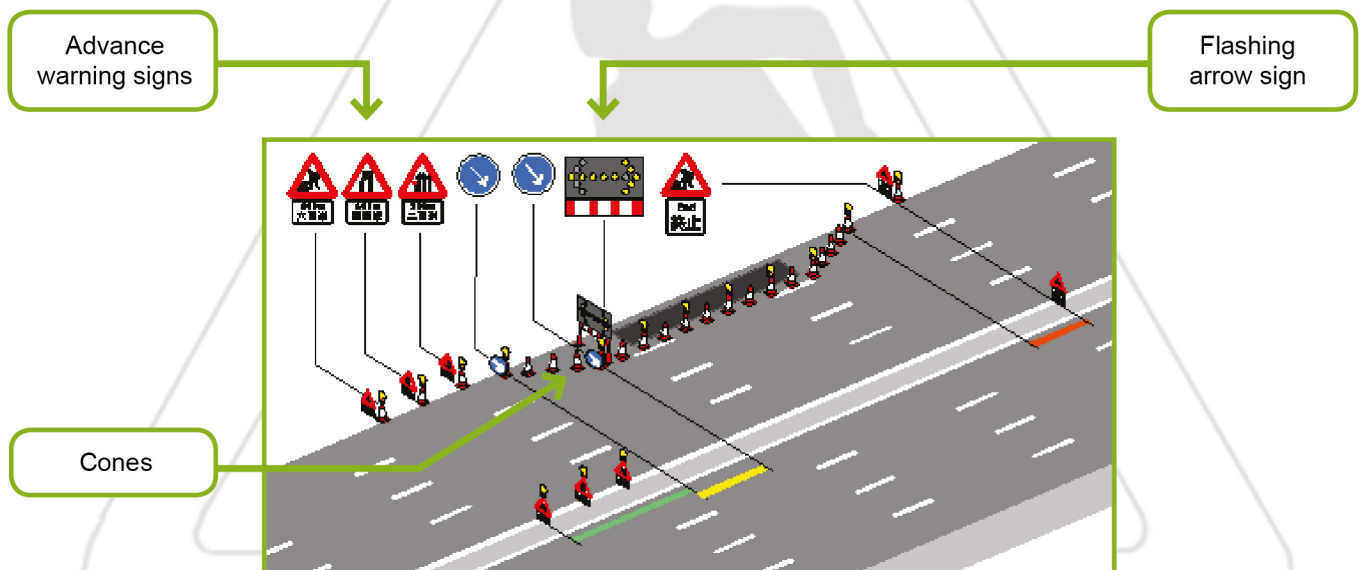


Figure 3: Advance warning signs, cones and flashing arrow signs

Reference Material:

- Code of Practice for the Lighting, Signing and Guarding of Road Works, Highways Department, Hong Kong Special Administrative Region (HKSAR)



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