



Systemic Safety Alert **Tunnelling Works**

Major systemic safety problems

Due to the confined nature of a tunnel under construction, any inadequately controlled work hazards may lead to incidents with disastrous consequence. As an illustration, in case of fire/explosion, the confined environment of a tunnel work site will quickly be filled with smoke, rendering escape and rescue of persons inside the tunnel extremely difficult. Major systemic safety problems detected include: -

- slack control over access/egress of workers/vehicles at tunnel entrance (e.g. no physical barrier and/or ineffective tally system at entrance);
- poor site management with inadequate control measures to prevent persons from being struck by vehicles or other mobile plant;
- lack of safe system of work/measures to control fire/explosion hazards by, for example, allowing the conduct of incompatible activities, like fueling and welding, in close proximity in a confined environment ;
- lack of effective control systems to prevent uncontrolled entry of persons/vehicles into the danger zone near tunnel face and unauthorized commencement of mucking out activities in the drill-and-blast cycle;
- inadequate supervision of designated personnel responsible for execution of safety requirements and independent certification of permit-to-work system; and
- ineffective hazard communication through safety instruction and task specific training to workers, especially those of ethnic minorities.

Accident prevention measures

In view of the severity of risks associated with tunnelling works, RSOs should keep vigilant surveillance of the safety conditions of the tunnels and where appropriate review the systems and hazard control measures to keep abreast with the progress of



the tunnelling activities, changes in job methods, plant, etc.

RSOs should advise their employers/clients to: -

- adopt specific approach in conducting risk assessments and formulating safe system of work and devise appropriate task-specific control measures;
- put in place stringent control and monitoring mechanism to ensure proper discharge of the safety duties by the designated personnel vested with specific safety responsibilities, e.g. compliance checking and independent certification in connection with the implementation of the system of work;
- develop and implement effective proactive inspection programme specific to tunnelling activities, timely report any violations to his employers, and take appropriate follow-up actions for prompt rectification;
- establish and implement effective coordination mechanism to facilitate better coordination and communication among different levels of project staff involved and different sub-contractors in implementation of the system of work; and
- arrange suitable and specific training to enhance the competence and performance of project staff vested with specific responsibilities in implementing the safe system of work.

Refueling of diesel plant and equipment inside tunnels under construction, especially when bulk transportation, storage and handling diesel fuel are involved as well as in a confined space environment, could give rise to imminent fire/explosion risks and thus disastrous consequences. Therefore, effective safe systems of work and control measures, including the safety measures in Annex, should be put in place.

RSAs should take into account these systemic safety problems and accident prevention measures in executing safety audit functions.

**List of Safety Measures for Diesel Refueling on Tunneling Sites**

A	Safe System of Work
	Specific risk assessment for diesel refueling work inside tunnels
	Hazard identification, including but not limited to the following: • Elimination of hazards, i.e. avoidance of refueling inside tunnels as far as reasonably practicable • In case refueling outside tunnel is impracticable, number of vehicle(s)/ plant(s) to be refueled and refueling frequency should be minimized
	Formulation of fire safety management plan, including but not limited to the following: • Planning of work • Formulation of method statement/ safe working procedures • Emergency preparedness, e.g. contingency plan, fire evacuation drills to be arranged with Fire Services Department (FSD)
	Proper implementation of the safe work method
	Regular monitoring of the safe work method
B	Storage of Diesel
	Diesel to be stored within exempt quantity unless otherwise approved by FSD
	Diesel to be contained in tightly-sealed metal container
	All containers of diesel to be properly labelled
	Drip pans to catch any leakage
	Oil-absorbent materials for spillage control
C	Designated Diesel Transporting Vehicle
	Properly-constructed vehicles with suitable warning signs
	Diesel to be conveyed shall be within exempt quantity
	With suitable fire extinguishers, e.g. two 5kg dry powder type on each side of the vehicle and accessible from outside the cab
D	Designated Refueling Bay
	Engine to be switched off before refueling
	No hot work/ naked flame within 10m from the refueling areas/points
	Provision of warning signs of “SWITCH-OFF ENGINE” and “NO NAKED LIGHT” near the designated refueling bay
	Adequately ventilated
	Safe distance for traffic and roads
	Partitions, etc. to be made of non-inflammable materials
	Sill to prevent fuel spillage and all spillage to be treated promptly
	Separated from vehicle repair/ servicing bay
	Suitable fire extinguishers, e.g. fire watcher equipped with 1 dry powder type fire extinguisher and 2 sand buckets
	Combustible gas detectors to be installed at/near the refueling bay in the tunnels
	Anti-static hose/ pump with self-closing nozzle/ shut off tap
	Refueling work to be conducted by designated and trained personnel
	No diesel to be kept inside tunnels except when refueling work is actually done
E	Electric Pump
	Electric pumps to be conformed to BS EN 60079 or other relevant international standards

Remarks: The above safety measures should be endorsed by an independent fire safety consultant.



職業安全及健康部
Occupational Safety and Health Branch
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Labour Department



For enquiry about storage of diesel exceeding exempt quantity, please contact the Fire Services Department at telephone 2417 5757 or e-mail fsdgd@hkfsd.gov.hk.

Labour Department
Fire Services Department
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