

Emergency Planning for Combustible and Waste Material Stored in Intermodal Freight Containers

Guideline No. 50

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Sponsor: Dangerous Goods

Authorised by: Director, Fire Safety

Approval level: Fire Safety
First issued: July 2018
Review date: July 2018
Version number: 1

1. PURPOSE

This guideline summarises the expectations of Fire Rescue Victoria (FRV) in regards to emergency preparedness and response planning at facilities storing Combustible Recyclable Waste Material (CRWM) in intermodal freight containers ('shipping containers'¹).

The position of FRV has been established after inspecting sites storing CRWM in shipping containers as well as consideration of relevant engineering standards and Fire Investigation & Analysis reports.

The intent is to provide clear and concise minimum requirements to operators in order to ensure the continued effectiveness of emergency preparedness and response measures.

2. SCOPE

This guideline applies to all facilities storing **Combustible Recyclable Waste Material (CRWM)** in shipping containers stored in **open yards** within the FRV area of operations.

An **open yard**² is defined as *"an area greater than 500 m² that is located external to any building, which is used for the storage or processing of combustible materials or substances"*.

3. POSITION

FRV have adopted the position of the United Kingdom Waste Industry Safety and Health Forum³ that storing wastes within enclosed ISO Containers provides a significant reduction in fire safety risk when compared to outdoor stockpiling of baled or loose CRWM. Accordingly, when material is stored in containers, the Victorian EPA Guidelines⁴ relating to stack size, separation distances and firewater provisions for uncovered baled or loose CRWM should not apply.

¹ Applies to all shipping container types, e.g. 20ft and 40ft; Standard and High Cube.

² AS2419.1:2017 Fire hydrant installations, Part 1: System design, installation and commissioning or as amended.

³ WISH: <https://wishforum.org.uk/wp-content/uploads/2017/05/WASTE-28.pdf> Clause 5.3.4

⁴ <http://www.epa.vic.gov.au/business-and-industry/guidelines/waste-guidance/combustible-recyclable-and-waste-materials>

However, storing comingled material in containers does not completely remove the risk of fire or fire spread and FRV consider that operators are obliged to identify, implement and maintain suitable control measures – including those associated with emergency preparedness and response – commensurate with the risks associated with their operations.

4. RISK ASSESSMENT

FRV, as an **emergency response** stakeholder of operations that handle, store and transport CRWM, seeks confidence that operators have assessed the risks at their site in the course of establishing a robust emergency plan for all potential fires at a facility.

AS/NZS ISO 31000:2009 *Risk Management – Principles and guidelines* provides general advice which operators can use to develop, implement and improve the way they manage fire-related risks.

4.1 HAZARD IDENTIFICATION

FRV take the view that operators of facilities storing CRWM should conduct a site-specific hazard identification exercise. The systematic identification of potential fire scenarios can then be used to:

- identify the controls that workers rely upon to both prevent and mitigate all potential fire. Operators should establish 'performance standards' for the controls in order that they can clearly be identified as functional (or otherwise). Maintaining controls to the defined standard should be implemented through inspection, testing and maintenance activities at the site. At the highest level, there should be a verification activity that ensures the prescribed work is being conducted – this implies the development of Key Performance Indicators (KPIs) but could be as simple as weekly meetings, periodic review etc., all of which are common features of safety management
- inform the site emergency preparedness and response plans, clarifying roles and responsibilities, not just on site but also with regard to the emergency services. This might reasonably include clarity on the operation of specialist equipment held on site in an emergency (e.g. the reach of container stacker and who would be expected to operate such equipment).

Table 1 details risks associated with storing CRWM in containers. It is included to inform site-specific risk assessment and control measure identification but is not intended to be comprehensive.

TABLE 1: CONTAINERISED CRWM RISKS AND CONTROLS

Activity	Risk	Controls
Container packing/unpacking	<ul style="list-style-type: none"> • Dropped/falling object • Confined space entry • Toxic exposure 	<ul style="list-style-type: none"> • Operator training • Operating procedures • Forklift procedures
Container handling	<ul style="list-style-type: none"> • Dropped object (failure of lift spreader gathering device/lifting sling/fork lift tyne) • Collision • Eccentric centre of gravity 	<ul style="list-style-type: none"> • Traffic rules; incl. segregation of cranes, forklifts, light vehicles, trucks. • Forklift/crane specifications, maintenance activities • Operator competence/awareness
Container stack stability (tipping, sliding)	<ul style="list-style-type: none"> • Wind (toppling) • Subsidence/soft ground • Eccentric/uneven loading (e.g. water-logged container) 	<ul style="list-style-type: none"> • Land use planning/permit conditions • Stack configuration (rules) • Shielding empty containers with full containers • Early warning devices (e.g. anemometers), reduced stacking (bad weather rules) • Hardstand/level, durable and/or compacted ground • Twistlocks/bridge fittings/lashing rods
Container stack collapse (racking, collapse)	<ul style="list-style-type: none"> • Overloading (non-alignment of corner fittings) • Degraded asset integrity (e.g. corrosion) • Over-tensioning/loosening of devices (e.g. lashing rod) 	<ul style="list-style-type: none"> • Container inspection(s) • Stacking rules/protocols • Corner post requirements
Container stack fire	<ul style="list-style-type: none"> • Hot Work • Vehicle fire/bush fire/adjacent combustible material fire • Exothermic reaction (in container) 	<ul style="list-style-type: none"> • Access restrictions • Installed firewater systems, hydrants, hoses • Separation from vehicle access lanes, on-site offices/other buildings • Emergency plan (preparedness and response)

FRV has had the opportunity to review fire risk assessments prepared for specific CRWM facilities and would observe that:

- fires in shipping containers will be ventilation controlled. In the absence of robust evidence, FRV does not support the assumption made in some studies that fire in containers will self-extinguish
- FRV does not accept risk evaluations that determine risk to be 'negligible' or 'acceptable'. FRV consider that, given the fuel loads involved, risk levels are at best 'tolerable if subject to suitable control(s)'
- the potential consequences of fires at facilities storing CRWM in shipping containers should extend to the consideration of impacts to the local community and the environment (e.g. smoke, particulates, fire-water run-off).

4.2 PRESCRIPTIVE REQUIREMENTS

4.2.1 ENGAGEMENT

FRV want a proactive, collaborative and respectful relationship with operators in order to ensure the timely and effective implementation FRV's emergency preparedness and response expertise and the best use of resources in the event of an incident. This shall involve:

- early notification – operators advising FRV of intent to store CRWM in containers prior to commencing or making changes to operations
- organising a site visit by specialists from FRV so that FRV can endorse and advise in regard to the fire engineering infrastructure at the facility and the FRV's role in responding to incidents
- the development and implementation of Emergency Plans, including exercise, in conjunction with FRV.

4.2.2 OPERATING REQUIREMENTS

FRV consider that stack dimensions be kept to a maximum 5 containers high, 6 containers wide and 10 containers long. Vehicle access to the container stack must be possible from three sides.

In order to optimise firefighting access, any stack stability containers should be stacked so that the longitudinal axis is in line with the predominant wind direction⁵.

The spacing between stockpiles of containers must be at least 8m or the minimum operating requirement of the sites' stacking equipment (whichever is greater) in order that emergency services/site response vehicles have sufficient access. FRV must be able to gain access to properties in an efficient manner; and have sufficient room to manoeuvre and operate appliances and emergency vehicles within the proximity of the emergency.

FRV recommend that container storage configurations ought to allow fire-fighter access to any container in a stockpile within 10 minutes.

⁵ Per AS3711.10:2000(R2016) Freight containers Part 10: Handling and securing or as amended

The operators of facilities storing CRWM in containers should ensure that:

- aluminium containers are **not** used to store CRWM
- containers with potentially flammable or combustible insulation are not used to store CRWM
- ventilation fittings on containers used to store CRWM limit airflow to a suitable minimum (i.e. sufficient to limit the build-up of heat, moisture and fumes) and incorporate screens that will deny access to rodents and larger insects.

Fire hydrants shall be provided and located so that every part of all storage of CRWM in an open yard is within 70m of an external (outdoor) fire hydrant outlet. Firewater requirements (flow rate and duration – see Section 4.3) must be determined by operators and site-specific emergency plans must reflect what is available – including contingency planning where a shortfall is anticipated for some potential fire scenarios. The placement of fire hydrants should consider:

- proximity to containerised CRWM material
- the amount of radiant heat the fire hydrant may be exposed to in the event of a fire
- the protection of fire hydrants and/or associated pipe work from external damage
- access to and egress from the site – including FRV appliances
- designated, hardstand staging areas and clearance from traffic
- provision of adequate lighting – including under emergency conditions
- fire hydrant proximity to bunds or other containment areas
- the location of isolation valves.

4.3 CONTROL MEASURES

The effective prevention and extinguishment of fires at sites storing baled, comingled recyclable material in full or partially full shipping containers can only be achieved when effective controls are implemented by the operator. FRV observe that these controls may include, but are not limited to the following:

- screening procedures associated with sorting comingled combustible recyclable material
- controls associated with baled CRWM being 'quarantined' prior to being sealed into a container
- the systems used to store comingled material including ventilation systems and other fittings on containers
- suitable firewater provisions (flow rate, duration, containment of contaminated run-off – AS2419.1:2017 *Fire Hydrant Installations*), flow assurance activities
- the inspection, testing and maintenance programme for installed fire-fighting equipment
- site-specific container stack height, depth etc. protocols
- container integrity management (asset integrity controls, no aluminium containers etc.)

- handling procedures – container packing / unpacking, container movements (including in an emergency such as a fire) – comparison against relevant aspects of AS 3711.10:2000(16) - *Freight containers, handling and securing*
- crane/forklift specifications, maintenance requirements
- crane/forklift operator competence and fitness-for-work (fatigue management etc.) practices
- hardstand specifications/stacking rules/protocols
- local and direct brigade alarms, mustering and headcount procedures, Emergency Information Containers (EIC) at each site entrance (containing maps, manifest, means of isolation for utilities etc.), associated staff training etc.
- site security, access, CCTV footage.

5. EMERGENCY PLANS

Critical considerations for the emergency response at a site storing CRWM in shipping containers are:

- staff are trained in the site-specific emergency response procedures
- roles and responsibilities within the site emergency management team – including a dedicated Emergency Services Liaison Officer
- availability of firewater (flow-rate and duration)
- containment of firewater run-off
- **Emergency Information Box** (pictured) to be located at site entrances where FRV could arrive in an emergency. The box should contain
 - site plans detailing installed fire protection equipment, staging areas, etc.
 - evacuation points and warden identification
 - inventory information
 - on-site and off-site emergency contact information
 - gas, electricity and water isolation points
 - drainage, spill and firewater containment
- signage – entry point information alerting firefighters to the large quantity of combustible material held at the facility and the resources available to responders.



Note: *this is a controlled document and may only be modified by authorised personnel after review by FRV Fire Safety Advisory Group.*