GUIDELINES for MANAGING WORKPLACE HEALTH & SAFETY within the WASTE MANAGEMENT and RECYCLING INDUSTRIES in WA.

2009
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1.0 SCOPE

The Guidelines for Managing Health and Safety within the Waste Management and Recycling Industries provide guidance for employers who work in, or who are closely associated with, the waste management and recycling industries.

The Guidelines have been developed by the Western Australia Branch of the Waste Management Association of Australia through a consultative process in which waste contractors, local government, unions, designers, plant manufacturers, operators and maintenance personnel were invited to participate.

Whilst the Occupational Safety and Health Act (WA) 1984 (the Act) places duties on the designers, manufacturers, importers, suppliers and operators of all types of plant, these Guidelines focus on the safe operation of common plant which is used within the waste management industry. Information about specific plant features and regarding detailed plant design considerations can be found in Appendix 4.

The Guidelines also provide information about safety considerations for work at waste collection depots, landfill sites, transfer stations and material recovery facilities. The activities of green-waste and bulk verge pick-up and hazards associated with specialised waste treatment plants have not been covered in these Guidelines. Obligations which may be imposed under other legislation which applies to employers in the waste management industry is not specifically discussed or considered and employers may need to read these Guidelines in conjunction with other legislation such as the Road Traffic Act 1974 and the Australian Design Rules for Motor Vehicles and Trailers.

Where appropriate, reference has been made to occupational safety and health legislation, codes of practice and guidance materials. These Guidelines focus on the most likely causes of injury or harm to people in the waste management industry and suggested means for eliminating or reducing the risk of injury or harm. This focus is in line with the spirit of the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations (WA) 1996.
2.0 INTRODUCTION

These Guidelines are designed to raise awareness of potential hazards and to facilitate improved safety and health outcomes for people in the waste management industry. This document is not an all encompassing safety guide and is provided for the purposes of providing information and guiding possible control measures which can be implemented to address industry specific risks.

The Occupational Safety & Health Act 1984 (WA) imposes a primary duty of care on employers. Section 19 of the Act requires that employers provide and maintain, so far as is reasonably practicable, a working environment in which workers are not exposed to hazards. In order to meet this duty employers must actively identify hazards and manage risks associated with the work that they do and their workplace.

The Act is supported by more detailed requirements in the Occupational Safety and Health Regulations 1996, and further supported by a range of guidance material such as Codes of Practice and Guidance Notes. This framework is provided in flowchart format in Appendix 1 of these Guidelines.

A copy of the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996, must be readily available at the workplace and can be accessed via the internet at www.slp.wa.gov.au. Detailed information about the general duty of care is available in the WorkSafe WA Guidance Note: The General Duty of Care in Western Australian Workplaces.

The format of this document reflects the lifecycle of domestic and industrial waste, typically collection, transportation, disposal and processing. The information is these Guidelines is based on the current working and legislative environment and this document should be reviewed on a regular basis to ensure it’s ongoing relevance and value.

A comprehensive listing of further references is provided in Appendix 5 - Sources of Further Information. Additional information can also be obtained from WorkSafe WA and at www.worksafe.wa.gov.au.

All employers within the waste management industry should implement a comprehensive safety and health management system. The system should consist of written policies and procedures which are underpinned by very specific work instructions and safety directions.

For systems to be effective they must be more than documents on a shelf. The workforce must be educated about the contents of the system and it must be enforced at a practical level to ensure that it is followed.

Employers can use the information in these Guidelines as a basis for their safety and health management system and must adapt their system to their particular workplace, activities and people by including such further information and instructions as may be required.
3.0 DEFINITIONS

For the purpose of these Guidelines, the following definitions apply;

- ‘Access door’ means a door which provides access for maintenance or servicing, can be readily opened for maintenance or service activities, and is interlocked.
- ‘Act’ means the Occupational Safety & Health Act 1984 (WA).
- ‘Bin’ means a refuse receptacle usually made of plastic with a capacity of 80, 120, 140, 240, 360, 600, 700 or 1,100 litres.
- ’Commissioning’ in relation to plant, means performing the necessary adjustments, tests and inspections before the plant is used to ensure that the plant is in full working order in accordance with the requirements specified in the design of the plant and includes recommissioning.
- ‘Container’ means a refuse receptacle usually made of metal. The larger commercial types are measured in cubic metres. In the waste management and recycling industries the term bin and container overlap - both terms are used and are often interchangeable.
- ‘Deadman Control’ means a control where mechanical movement can only occur while the control is being activated by a person and release of the control causes all movement of the mechanical parts of the machine/equipment to STOP. The deadman control must not be overridden by any other mechanism.
- ‘Driver’ means the person authorised by his or her employer to operate any refuse collection or transfer machine.
- ‘General Hand’ or ‘Depot Hand’ means a person in a material recovery facility, garbage depot, landfill depot or transfer station that carries out general duties.
- ‘Hazard’ means anything that may result in injury or harm to the safety and/or health of a person.
- ‘Hazardous Waste’ means any waste containing significant quantities of a substance that may constitute a danger to the life or health of living organisms and the environment, or pose a threat to the safety of humans or equipment if incorrectly handled. Hazardous waste properties include toxicity, flammability, chemical reactivity, corrosivity and infectiousness (NSW Waste Boards, 1999).
- ‘Landfill’ means a waste facility used for the purpose of disposing waste to land (NSW Waste Boards, 1999).
- ‘Landfill Gas Collection’ (Methane Farming) means the extraction of gas formed from the decomposition of waste in a landfill (WMAA National Landfill Division).
- ‘MGB’ means a Mobile Garbage Bin (as described in ‘Bin’ above).
- ‘Tipper’ means a self-tipping bulk bin for tipping into a larger receptacle.
- ‘MRF’ means a Material Recovery Facility.
- ‘Offsider’ means a person assisting in a mobile refuse collection vehicle.
- ‘Operation’ means use, maintenance, installation or commissioning.
- ‘Plant’ means any machinery, equipment, appliance or implement or tool and any component or fitting thereof or accessory thereto.
• ‘Plant Operator’ means a person who controls or operates any machinery, equipment, appliance, implement or tool and any component or fitting thereof or accessory thereto.

• ‘Refuse’ means domestic or commercial waste or recyclable materials and includes any type of solid waste which may be handled by the collection and processing machines covered by these Guidelines. This may be garbage (soft and hard), rubbish, building rubble, ashes, incinerator residue, plant trimmings and recyclable materials such as aluminium, plastic, steel, glass paper/cardboard, etc. In these Guidelines, the term ‘refuse’ specifically excludes all toxic, asbestos, human, medical and liquid wastes which are normally handled by specialist equipment.

• ‘Regulations’ and ‘Regulation’ means the *Occupational Safety & Health Regulations 1996 (WA)*.

• ‘Risk’ means, in relation to any injury or harm, the probability of that injury or harm occurring to a person or others in the workplace and the likely severity of the consequences should the harm occur.

• ‘Safety Factor’ means the ratio of the breaking load of a component to the maximum design load or stress when used in accordance with the designer/manufacturer's instructions.

• ‘Service Panel’ means a cover designed to be removed for maintenance and/or service activities and which requires an engineering tool such as a spanner or Allen key to remove it.

• ‘Transfer Station’ means a waste handling facility used to transfer waste from collection vehicles to a bulk haul vehicle in order to achieve long-distance transportation efficiency. It may also be used to sort and redirect waste with the potential to recycle prior to disposal *(NSW Waste Boards, 1999)*.

*These terms must be read in conjunction with the Occupational Safety & Health Act 1984 (WA) and Occupational Safety & Health Regulations 1996 (WA) and are restricted by the above definitions table in relation to some or all of the contents of these Guidelines.*
4.0 KEY SYSTEMS FOR EFFECTIVE MANAGEMENT OF RISK

4.1 Legislative Context

In our community, a range of legislation and standards are in place to ensure that people go about their private and working lives without harming or threatening the lives of others who may be around them. In helping to meet this goal, this document focuses on hazards and conditions that are known to exist in many waste management related workplaces.

In carrying out work related operations, there are a number of considerations which must be taken into account to assist in meeting the requirements of the law and what can be called good practice for this industry.

There are various broad and specific requirements found in:

- Acts (legislation);
- Regulations (legislation);
- Codes of Practice (guidance);
- State and Federal Government/Agency guidelines, permits and licenses; and
- Australian and other Standards.

A Code of Practice is designed to have more descriptive detail than Regulations, but is usually not as detailed as an Australian Standard. Due to the diversity of the waste management industry, there are a number of important risk related issues that need to be considered when exploring risk management measures.

Areas of particular technical importance include confined space work, working at heights, noise, chemicals, plant safety and dealing with medical emergencies. More general areas which require the committed effort of all people at the workplace include identification and prioritisation of hazards, risk management strategies, open communication about occupational safety and health matters, enforcement of directions and procedures developed to address occupational safety and health concerns, and an awareness of the importance of safety and health in the workplace.

The Occupational Safety & Health Act 1984 (WA) defines the responsibilities of employers, employees, contractors, visitors and other people at the workplace and also sets out the compliance regime.

Employers and people who have the capacity to control the activity at a workplace have a duty to do all of the following:

- provide safe and suitable plant and equipment;
- provide safe and suitable work procedures;
- provide the necessary instruction and training;
- consult and cooperate with the workforce;
- provide adequate personal protective clothing and equipment;
- ensure the safe use, cleaning, maintenance, transportation and disposal of plant; and
- ensure the safe use, handling, processing, storage, transportation and disposal of substances (chemicals).
The duty is based on what is reasonable and practicable in the circumstances, weighing up the seriousness of the risks, the availability of controls, the costs and the ability of the employer to make the necessary changes.

These Guidelines set out the considerations which an employer should take into account when dealing with common workplace hazards and deciding on appropriate control measures to reduce or eliminate the associated risks.

### 4.2 Consultation

One of the obligations imposed on employers by the Act is to ensure that the people at the workplace who may be affected by particular work activities, tasks, or exposures are encouraged to contribute to the development of occupational safety and health policies and procedures.

Interaction and open communication about safety and health matters is called consultation, and it can be achieved via formal or informal processes. Consultation can consist of regular tool box meetings, the appointment of people at the workplace to manage safety issues, a regular interface between management and employees, and the distribution of information about safety and health matters.

It must be recognised that it is usually the general workforce who have the majority of the first hand knowledge regarding operations and are therefore well placed to identify potential problems and provide suggestions for practical control measures. Workers should also be actively involved in the development and content of Safe Work Procedures which outline the way in which particular tasks should be done.

Employees are usually particularly well informed about:

a) what activities may not have gone exactly to plan in the past;
b) what incidents or near misses have occurred;
c) what minor or other defects may prevail with certain plant;
d) what practices may be being applied that don’t quite meet designated Safe Work Procedure which were specifically introduced to make a task safer; and
e) why workers are not using a designated Safe Work Procedure.

If consultation and communication processes are not working properly, management may not receive information from the workforce in a timely manner. Decision making regarding risk management must be done by people who are aware of the nature, extent and seriousness of hazards.

### 4.3 Hazard Management

Effective risk management lies at the core of any successful safety and health management system. The process starts with regular, meaningful, formal and informal hazard identification processes. Commonly this type of activity is called a Hazard Survey or Safety Inspection in the waste management industry.

If an effective hazard identification process does not exist, problems (hazards) will not be discovered in a systematic way, hence it is more likely that they will be ‘encountered’.
An employer is required to:
   a) identify each hazard to which a person at the workplace is likely to be exposed;
   b) assess the risk of injury or harm to a person resulting from each hazard, if any; and
   c) consider the means by which the risk may be reduced.

(Regulation 3.1)

This process is usually called hazard identification and risk management.

Identifying Hazards
Hazards may be identified in several ways including via a physical inspection, safety audit, checking workplace injury and illness records, talking to employees about any hazards they have identified or experienced and observing how each work activity or task is being done.

The Reporting of Hazards
All people at the workplace should be required, and encouraged, to report hazards and incidents via a clear communication pathway. Employers may appoint people with OSH responsibilities (typically Managers and Supervisors) to receive reports of hazards and incidents and must respond to those reports in a structured and consistent way. This means that once hazards have been identified they must be investigated to determine what kind of response is required in order to manage any associated risks.

The extent of an investigation and further action will depend on the type of hazard and must be based on each situation as it arises to ensure it is appropriate and adequate.

Assessing the Risk
Once a hazard has been identified the risks associated with that hazard are identified by looking at the potential consequences if the hazard is not dealt with effectively.

Risks can be direct consequences to the health of people, the safety of people, as well as the impact a hazard could have on other items, processes or tasks which may affect the health and safety of people at the workplace.

Usually it is possible to make a list of the types of things that could go wrong (ie the risks) if a certain hazard isn't managed. Once that list of risks has been compiled it is necessary to work out the priority of those risks. This is done by allocating a rating to the risk based on a combination of the likelihood of the risk occurring and the seriousness of the risk occurring.

Risks which have a high probability of occurring may require urgent and significant action. Risks with a low probability but which could cause very serious injury or death may also require urgent and significant action.

Below is a risk matrix which sets out an example of the priority ratings process:
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<th>Consequences</th>
<th>Minor Injury/First Aid</th>
<th>Serious Injury</th>
<th>Major/Multiple Injury</th>
<th>Death</th>
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<td>Likelihood</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Extreme</td>
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<td>High Priority 2</td>
<td>High Priority 2</td>
<td>Priority 1</td>
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<tr>
<td>Medium</td>
<td>Low Priority 4</td>
<td>High Priority 2</td>
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<td>High</td>
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<td>Extreme Priority 1</td>
<td>Extreme Priority 1</td>
</tr>
<tr>
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<td>High Priority 2</td>
<td>Extreme Priority 1</td>
<td>Extreme Priority 1</td>
<td>Extreme Priority 1</td>
</tr>
</tbody>
</table>

Controlling the Risk

This step considers a range of measures in the order in which they are likely to achieve the best result and adopting the most practicable and appropriate measure or measures to eliminate or reduce the risk. It is important to ensure that the control measure itself does not introduce a new hazard into the system.

Once adopted, the control measures should be reviewed on a regular basis to ensure they remain appropriate.

There is a preferred method for deciding on the best control measures as shown here:

- **Most preferred**
  - Eliminate the Hazard
    - Remove the hazard which is creating the risk of injury
  - Substitute the Hazard
    - Identify alternative equipment, methods and processes with lower risk of injury
  - Isolate the Hazard
    - Create physical barriers between the source of the hazard and people
    - Eg screens, exclusion zones
  - Engineering Control
    - Modify work areas, equipment, or the source of the hazard
    - Eg guarding, ergonomic changes
  - Administrative Control
    - Modify work practices and processes
    - Eg rostering, rotation of tasks

- **Least preferred**
  - Personal Protective Equipment (PPE)
    - Provide physical protection to individuals
    - Eg safety eyewear, foot wear, head wear
Hazards in the Waste Management Industry

The waste management industry undertakes a diverse range of activities associated with the collection and treatment of waste. Some of the key hazards associated with these activities may include:

- fixed plant hazards which could lead to crush and laceration injuries;
- mobile plant and machinery hazards which could lead to crush and impact injuries;
- environmental hazards which could lead to exposure to toxic dust or fumes;
- chemical hazards (hazardous substances);
- manual handling and ergonomic hazards;
- falls from heights;
- working in confined spaces; and
- burns from hot waste and fires.

4.4 Induction and Training

People at the workplace must be trained to be aware of the safety and health system which has been implemented at their workplace. They should also receive training about their obligations, and the way that the employer considers best addresses specific and general hazards in the workplace.

People should be trained to raise their awareness of general safety issues and procedures relevant to the workplace. Specific people should also be trained about particular hazards relevant to their work. These people should be trained so that:

- they have a better understanding of any hazards and the nature, and seriousness, of the risks associated with the hazard; and
- they will be more competent to manage and control the risks through the way that they carry out activities which may impact or give rise to the hazard.

Induction Training

As a minimum induction, training should include the following topics:

a) hazard, accident, and injury reporting;

b) hazard identification processes (including safety inspections);

c) response for medical emergencies and first aid resources;

d) response for emergency evacuation of the site;

e) personal protective clothing and equipment – supply, use, storage and maintenance;

f) site security arrangements (restriction of access);

g) structure for safety communications, e.g. toolbox meetings, appointed safety officers, occupational safety and health representatives, working group or committee; and

h) fitness for work expectations, including with respect to alcohol, medications and drugs.

4.4.2 Specific Training

The following specific training may also be required, depending on the type of work and the person’s position within the organisation:

- working in confined spaces;
• handling hazardous substances (chemicals);
• working at heights;
• using fire extinguishers and other fire management;
• First Aid;
• plant competency training;
• working alone or in an isolated/remote location;
• working near powerlines;
• safe movement of vehicles; and
• managing vehicle loads (including managing loads on fire and leaking loads).

4.5 Accident / Incident Reporting

In order for an employer to manage the hazards and risks associated with the activities of their business, there must be an effective system for communication of issues before and as they arise. This means that there must be a system for proactively and reactively identifying hazards and risks and a clear pathway for responding.

Information coming to the employer about safety and health issues should result in an immediate response which is appropriate to the type and seriousness of the problem. There should be records kept of matters that are raised and managed so that, over time, this information will allow patterns, trends and problem areas to be identified.

There should be an Accident/Incident Reporting Procedure that:
   a) defines the form to be used for reporting;
   b) defines what should be reported and in how much detail;
   c) who should report and how quickly;
   d) where the reported information should go in the organisation; and
   e) who needs to respond to reports and sign off on action items.

A proper recording of hazard and incident information in a suitable register forms part of the business’ “corporate memory”. The register records hazards that have been identified and how the associated risk has been dealt with. This allows for successive Managers and Supervisors to learn from the past and to identify trends related to accidents and incidents.

Employees have a duty to report to their employer any hazards which may affect their safety and health at work. This is to enable the employer to take such action as may be needed to eliminate or reduce the risks associated with that hazard. It is often the people who work directly with plant, equipment, vehicles, and who are carrying out particular tasks, who become aware of potential safety problems first.

When a hazard, accident or incident is reported, the employer must respond by taking action. This can consist of a simple acknowledgement of a non-urgent and non-serious notification to a full scale investigation for significant matters. Employers are required to advise the person reporting a hazard of how it has been dealt with.

4.6 Emergency Management
Within the waste management and recycling industry there are many situations that require an efficient and pre-planned response in order to protect people and property in the event of an emergency.

Some potential emergency situations include:
- serious injury (medical emergency);
- escape of toxic materials or gases;
- fire;
- gas explosion (related to landfill gas collection);
- plant roll-overs or tip-overs; and
- armed assailants.

All foreseeable emergencies should be dealt with via a documented pre-planned response, which should cover as a minimum:

a) who will act in the role of Chief Warden;
b) who will be Zone Wardens;
c) how will the alarm be raised;
d) who will contact the relevant emergency services i.e. Dial 000 for Police, FESA or an Ambulance. Other relevant agencies may be Main Roads WA, Dept of Environment, Department of Mines and Petroleum (Resources Safety WA) or the Department of Commerce (WorkSafe WA);
e) besides people present at the worksite, who else should be contacted/ notified? eg. relevant neighbours;
f) what will be the primary and back-up communications system;
g) if the site has to be evacuated, where is the primary Assembly Point;
h) who will conduct a roll call; and
i) who will carry/look after the First Aid resources.

It is critical for the Chief Warden to be able to account for all people on site, so that “search and rescue” efforts are efficient and targeted.

Ideally, evacuation drills should be conducted at 3 monthly intervals to ensure that when an evacuation is required, it will be carried out promptly and effectively.

4.7 First Aid

In the event of a workplace situation where medical services are required, the initial treatment received is called First Aid. Employers should consider the nature of the work that occurs at the workplace, and during work hours at other locations, and should provide first aid resources that can effectively respond to foreseeable first aid situations.

Resources which are required include trained personnel and suitable equipment. It may also be appropriate to have a first aid room or other facilities.

Employees who are trained in First Aid should be recognised as First Aid Officers within the organisation and should be able to attend effectively to minor injuries. First Aid Officers should also be trained to respond to more serious first aid situations with actions that are aimed at preserving life until an ambulance arrives.
First aid treatment may extend to attempts to control bleeding, keeping the patient breathing and their heart beating, keeping the patient conscious and still, and generally relieving pain and discomfort.

All employees should be aware of who the First Aid Officers are and how they can be identified and contacted. A site map showing where First Aid kits are kept and listing First Aid Officer contact details should be displayed in various prominent locations around the workplace.

Where employees spend time away from the main work site, arrangements should be made for suitable first aid equipment and assistance to be available to these employees. This may include first aid kits being carried in vehicles, kept at specific alternate sites, and communication about first aid facilities by other site Managers.

It is critical that the first aid knowledge, information, equipment and facilities which are supplied are adequate and appropriate to the individual work areas controlled by the employer.

First Aid equipment and facilities should be maintained and re-stocked regularly and training should be kept up to date.

### 4.8 Injury Management

In the event that a worker is injured at work and is unable to return to their usual duties, they should submit a workers’ compensation claim to cover their medical and related expenses. The injured worker will require medical certification to support a claim and this should be in the form of a First Medical Certificate and Progress Medical Certificates.

Part of the workers’ compensation process is a duty on the employer to have an Injury Management System and to implement Return to Work Programs in accordance with the *Injury Management Code of Practice 2005*. This Code of Practice has the status of regulation and, together with the *Workers’ Compensation and Injury Management Act 1981*, imposes an obligation to support workers back into the workplace in alternative duties or a modified role wherever possible.

Employers must have a written Injury Management System which outlines the steps that the employer will take in the event of a workplace injury, and who at the workplace has day to day responsibilities for injury management. Formal Return to Work Programs must outline the goal of the program, restrictions on duties, tasks required to achieve the return to work, and a statement as to the agreement of the worker and employer. Return to Work Programs should be written based on the latest medical certificate and in conjunction with the worker and their treating doctor.

In complex cases or where the worker’s return to work is obstructed by factors such as operational concerns, interpersonal issues, medical or functional difficulties and communication problems, it may be appropriate to engage a vocational rehabilitation provider. The provider should be used to commence or progress return to work initiatives and should provide support to the employer and injured worker. It is not the role of rehabilitation providers to take over return to work activities, as this is the responsibility of
the employer, and it is in the interest of the employer to manage the return to work of the injured worker in a timely and effective manner.

5.0 WASTE COLLECTION AND TRANSPORTATION

Waste transportation is undertaken in many ways, depending on the type of waste, the nature of any associated hazards, and the amount of waste to be transported in one movement.

5.1 Compactor Systems

Compactor systems eliminate the need for multiple bin sites. Depending on the type of waste, the compaction ratio is approximately 4:1. There are several common compactor systems and vehicles used within the waste management and recycling industry, and these are described below.

There are many compactor sizes and configurations, custom designs and installations, and they all provide an efficient, hygienic and tidy waste removal system for most locations. Waste compaction, although efficient, is not always possible. Some industrial waste is unable to be compacted, so other processes are employed to collect and transport that waste in its raw form.

5.1.1 Front Load Compactors

The basic Front Loader Compactor configuration consists of a designated truck cab/chassis, onto which is mounted a compaction body with an arm system that extends over the front of the cabin to pick up commercial refuse bins. These bins vary in size from 1.5 to 6 cubic meters and can weigh up to 3 tonnes.

Safe Work Practices for Front Load Compactors

- Drivers must be trained to operate Front Load compactors;
- during operation of lifting gear (including bins) the vehicle must be stopped and stationary while lifting bins over the cabin roof;
- extreme care must be taken to avoid any overhead powerlines or structures;
- any refuse which has spilled onto the cab during the unloading operation should be removed and appropriately disposed of before moving to the next loading site;
e) external flashing beacons or warning lamps should only be in operation while the vehicle is in a bin pick-up/set-down area;
f) immediately after tipping the load, the tailgate should be closed and locked prior to moving off;
g) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the manufacturer and designer’s requirements;
h) in-cab TV monitor and rear mounted cameras should be regularly cleaned and checked for operation;
i) all in-cab warning lamps should be checked on a weekly basis, especially the “Hopper Door Open” indicator and “Lift-Arm Height Maximum” indicator;
j) all emergency stops must be regularly tested to ensure they are operational and must not be disabled; and
k) mirrors must be adjusted to enable the operator to view the Lift-Arm operation.

5.1.2 Rear Load Compactors

(Pictured Rear Load Compactor)

The basic Rear Load Compactor configuration consists of a truck cab/chassis, onto which is mounted a compactor body and tailgate that allows for loading of refuse from the rear. This type of unit can be hand fed or have different types of bin lifting devices fitted to pick up domestic and industrial bins.

The most common bin lifting devices pick up 120 and 240 litre mobile garbage bins (MGBs) which weigh up to 100 kg, with variations that can pick up 1100 litre MGBs which weigh up to 750 kg.

Winch and reeling systems are also used to load industrial type bins into the rear of the tailgate. Bin sizes range up to 6 cubic metres and can weigh up to 3 tonnes. Winches should comply with AS.1418.2 Cranes (including hoists and winches) - Serial hoists and winches.

Safe Work Practices for Rear Loader Compactors

a) Drivers must be trained to operate Rear Loader Compactors;
b) flashing beacons or warning lamps should only be in operation while the vehicle is in the bin collection area;
c) all working lights on the vehicle should be in operational order prior to work starting;
d) care should be taken while cornering because fully or partially loaded vehicles can become unstable due to a higher centre of gravity;
e) the vehicle Driver must be able to communicate to the Offsider visually, by radio, by buzzer or with hand signals;
f) Offsiders should not get off the vehicle while it is moving;
g) riding on the rear steps is prohibited;
h) Offsiders should not ride outside the cab or crew carrier;
i) crew carriers should only be used while travelling between collection points and only when the speed of the vehicle is less than 20km/h;
j) storage of waste or recyclables outside the body should not be permitted unless secured in storage compartments designed for such purposes;
k) bin lifters should not be carried in the fully up position while the vehicle is in motion;
l) when travelling extended distances, the bin lifter should be carried in the normal travel position with mechanical catches engaged;
m) all loads should be covered to prevent refuse ejecting or falling from the vehicle when fully loaded;
n) the hopper and tailgates must be cleared immediately after collecting waste and no refuse should be carried in tailgates;
o) immediately after tipping the load, the tailgate should be closed and locked prior to moving off;
p) all crew/cab and offsider communication systems should be checked on a daily basis and before use;
q) all rear warning horn or buzzer systems should be tested prior to work starting;
r) emergency stops located at all control stations should be checked weekly and must not be disabled; and
s) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer and/or designer.

5.1.3 Hook Lift Compactors

(Pictured Hook Lift Compactor)
The basic Hook Lift System configuration consists of a truck cab/chassis onto which is mounted a mobile/articulated arm and hook mechanism that is used to drag large industrial containers onto the rear of the unit. These containers vary in size from 2 to 40 cubic metres and can weigh up to 15 tonnes when full of refuse. There are four common methods of handling large containers (up to 40 cubic metres). These are:

- hook lift;
- winch and cable;
- bail hook and cylinder (eg Dinosaur); and
- chain lift (eg Merrell).

Safe Work Practices for Hook Lift Compactors

a) Drivers must be trained to operate hook lift compactors;
b) the Driver should ensure that no other person is near the loading or unloading area during operations;
c) the Driver should check that adequate space is available above the machine to allow movement of the bin during the loading or unloading operation;
d) the machine should be aligned as close as practicable to the container prior to attempting to drag it onto the lifting frame;
e) rear suspension stabilizers should be engaged prior to loading or unloading the bin;
f) the machine should not be driven unless the container is in the locked position and/or the lift frame is in the stowed position;
g) emergency stops located at all control stations should be checked weekly and must not be disabled;
h) if a container is to be placed on a public roadway overnight, the Driver should ensure that functioning flashing lights are positioned on the outside corners of the container. All flashing lights should be installed having regard to the requirements of the bin permit(s) and the requirements of the local authority;
i) the container should not be released until positioned on a stabilised surface;
j) the cam lock in the lifting arm should be checked at least once a month for positive application;
k) all container unlock warning systems should be visually checked by Drivers to make sure the container is not in the locked position;
l) access steps to gain access to the top of the hook-frame should be cleared of all mud or refuse build-up and defects reported immediately;
m) all work lamps should be tested and checked for operation prior to work starting; and
n) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer and/or designer.
5.1.4 Side Load Compactors

The basic Side Loader configuration consists of a truck cab/chassis onto which is mounted a compaction body and a hopper with a bin lifting device attached to the left-hand side. Refuse is deposited into the hopper where it is compacted into the body cavity. When the tailgate is opened refuse is tipped out by tilting the body.

The bin lifter is commonly attached to a slide mechanism which can extend out to 3.3 metres from the side of the machine. Eighty and 240 litre mobile garbage bins (MGBs) weighing up to 100 kgs are the types generally picked up by the Side Load Compactor. The lifting of MGBs of more than 240 litres is subject to manufacturer safe lifting restrictions.

Machines of similar construction are also used to pick up recyclables and the same safety requirements apply to these machines.

Safe Work Practices for Side Load Compactors

a) Drivers must be trained to operate dual-controlled Side Load Compactors;
b) Driver/operator should have an unrestricted view of the bin lifter and pick up area by direct viewing, mirrors mounted on the vehicle cab or closed circuit television. All of these systems should be cleaned and inspected prior to starting work for the day;
c) the Driver should only be permitted to drive the vehicle from the left-hand seat position while actually engaged in refuse collection pick-up;
d) Drivers with dual control cabs with remote vision equipment should adjust this equipment to their viewing needs prior to starting work for the day;
e) all other vehicle movements, including travel to the collection zone and to the tip site, must be carried out from the right-hand seat position;
f) flashing beacons or warning lamps should only be in operation while the vehicle is in the bin collection area;
g) Driver inspections of the hopper area during the collection round should only be carried out by using appropriately designed access ladder(s) or via a closed circuit television system;
h) immediately after tipping the load, the vehicle body must be lowered and the tailgate closed and locked;
i) search lamps (work lamps/flood lamps) should only be used during collection operation;
j) special attention must be given to rear search lamps to ensure they are switched off when not required;
k) all audible and visual warning lamps should be inspected for operation prior to starting work for the day;
l) all ladders should be kept clean and free of refuse and operators should be mindful of working at heights danger when climbing on vehicles;
m) any defects with dead man or interlock controls should be reported immediately, and work stopped until rectified;
n) emergency stops located at all control stations should be checked weekly and must not be disabled;
o) hopper access must be restricted to trained and qualified personnel only; and
p) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer and/or designer.

5.1.5 Roll On Roll Off (Ro / Ro) Frames

(Pictured Roll On – Roll Off (Ro/Ro)

Roll On, Roll Off containers are configured for uncompacted loads. The waste container is hydraulically tipped and then winch retrieved prior to transportation from the pick-up site to the waste site. The RO/RO system is comparatively easy to use. It can be fed by hand, chute, conveyor, tippler and other specialist equipment.

The large rear doors make depositing bulky materials relatively easy. Bulk containers are used for dense, bulky, non-compactable commercial and industrial wastes. Container sizes range from 8 to 31 cubic metre capacities and are made of heavy duty steel. High volume waste producers can utilise an on-site stationary or transportable compactor to further reduce costs and service requirements.

To retrieve the container a steel wire rope is attached to the front of the container, drawing it onto a frame. As the container comes in contact with the support frame it is drawn along the frame to its stop or travel position where it is locked in place for transport.

The Safe Work Practices for Hook Lift Compactors also apply to Roll on –Roll Off operations.
5.1.6 Mini Compactors

These vehicles operate in most respects the same as their larger counterparts and only differ in size and weight requirements. The vehicles operate effectively where space precludes larger vehicle operation or smaller loads are expected such as at public park or shopping areas, sporting fixture clean up sites and other events where smaller bins are used. Smaller vehicles are also used specifically for recyclable pick up operations for local governments or other waste operators where the amount of waste to be picked up and transported is relatively small.

Safe Work Practices as applicable to Side and Rear Lift Compactors must also be applied when using Mini Compactors.

5.1.7 Waste Skip Bin Loader

This type of vehicle is designed to provide manoeuvrability in tight places. Flexibility in the positioning of bins and the capability to lift bins over obstacles allows this system to be used in places where space and access may be limited.
This waste system is often utilised in situations where waste is generated by the work involved, such as demolition, building, metal fabrication and wood working.

Skip bin drop off and retrieval operation is controlled via hydraulic operation from the side of the truck cabin. The bin or skip is attached to a horizontal cross member by chains that are attached to two large swing arms. The arms control the movement forward and back (on and off truck) while the cross member supports the weight of the load contained in the skip. This operation is limited to the rear of the vehicle which is not always suited to some operational parameters.

The Safe Work Practices for Front Load Compactors also apply to Waste Bin Skip Loaders.

5.1.8 Transfer Trailers

Transfer Trailers consist of a prime mover truck chassis towing a container-type trailer into which refuse has been loaded. The truck and trailer transport and transfer the waste to a landfill site. The refuse may be loaded loosely via an open top construction or alternatively compacted through a rear door opening into an enclosed container. The ejection of refuse at the landfill site is generally via a walking or elevator type floor.

Safe work practices for Transfer Trailers
a) the loading system should be such that the refuse is distributed evenly about the longitudinal centre line of the machine. For example, loading lips should project refuse to the centre line of the container;
b) if the loading operation is a one-sided operation, there should be visual inspection and if necessary, action taken, to ensure the load is evenly distributed before driving;
c) the operator should check the loading site visually before discharging the refuse to ensure adequate room is available to allow all of the refuse to be unloaded;
d) trailers must be used and maintained in accordance with the manufacturer's instructions or manual; and
e) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer and/or designer.
Transfer Trailer Safe Tipping Procedure

a) all manually operated doors must be mechanically restrained when opened to prevent high winds from accidentally moving them during tipping operation;

b) an audible warning device and flashing lamps (one each side) should operate at the rear of the machine during the actual tipping procedure;

c) only one Transfer Trailer should be at the tip face at any time;

d) a stable, horizontal tipping surface should be present for the trailer prior to commencing tip action;

e) should there be any indication of subsidence or unusual ground conditions, the process must not be commenced, or if there is any movement during the tipping process then it must be stopped and an alternative location found;

f) the Driver must be satisfied and confident with the ground conditions of the tipping surface before commencing to unload in the designated area;

g) the Driver is to ensure that the tailgate is unlocked and raised to the open position prior to raising the trailer body;

h) the Driver is to ensure that the vehicle’s trailer brakes are engaged, and that the vehicle transmission is in neutral;

i) the Driver is to remain in the cab of the truck during the tipping process. Should the Driver need to alight from the cab whilst the trailer is in the raised position, the hoist lever lock must be applied. At no stage is any person to enter in or around the chassis rail area whilst the trailer is in the raised position;

j) the Driver may ask for instruction on tipping locations from the landfill waste placement staff prior to commencing tipping of the load, however this in no way minimises the Driver’s responsibility to ensure adequate ground conditions before tipping;

k) the landfill waste placement staff are to assist, where practicable, to ensure that there are no other vehicles or personnel entering the fall area of the waste before the Driver commences tipping. The minimum lateral distance from the tipping vehicle must be a minimum of 15 metres;

l) the Driver is not to commence tipping if there are any vehicles or personnel within the fall area of the tip truck (as previously stated a minimum of 15m). This includes if the instruction has been given to commence tipping. The Driver has the ultimate responsibility for the tipping activity;

m) wind direction and velocity must be considered. It may be necessary to face the truck directly into the wind. If there is a heavy cross wind or the possibility of turbulence, then the transfer trailer Driver is not to commence tipping if, in his or her opinion, the wind is blowing too hard, or of such volume that it may cause the vehicle to become unstable;

n) while the vehicle is tipping, the Driver must ensure that no other vehicles or personnel enter the fall area of the tipping vehicle;

o) should any vehicle or personnel enter the fall area of the tipping vehicle, the Driver is to immediately stop the tipping operation and wait until the other vehicle and/or personnel are removed from the area. Thereafter, tipping may recommence;

p) Should a load become stuck in the back of the tipping vehicle, the body is to be lowered and the waste removed;

q) If the load is unable to be easily removed from the truck, the truck is to leave the site with the load still intact; and
r) The transfer vehicle must not be driven away from the designated area until the trailer body has been completely lowered.

(Ref EMRC Site Tipping Procedure for Articulated Trucks 23559)

5.2 Truck Maintenance

The employer, main contractor or self employed person must ensure that maintenance, servicing and testing of the waste collection and transportation vehicles and other plant is carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer and/or designer.

6.0 WASTE TREATMENT

6.1 Landfill Operation

Landfill sites are usually located within 50 kilometres of the centre of waste generation or a waste transfer station. The landfill operation should have on-site equipment to compact the waste (to maximise landfill volume), to compact soils covering the waste, to allow easy access for delivering waste to the working face, and to ensure orderly development of the landfill site. Protection of the environment is also important to the sustainable operation of any landfill site.

Proper landfill operations should aim to minimize costs, while at the same time adopting sound management practices to protect their assets and the environment. Other operating goals include meeting regulatory requirements and maintaining the integrity of liner and leachate collection systems, and controlling surface water run-off to prevent erosion or ponding of over-filled areas.

6.1.1 Plant Operations

Plant operation at landfill sites can generally be divided into two broad areas of operation:

1) movement of waste transport vehicles into and out of the landfill site and at the tip face; and

2) movement of plant and other equipment at the waste site or tip-face in spreading and compacting operations.

Movement of Waste Transportation Vehicles

The operation of waste transport vehicles has been mentioned in section 5. The basic operation consists of these vehicles tipping waste on the edge of a hard stand in front of the working face of the compaction area.

Vehicles entering the waste facility will be weighed to assess the waste content and sent on to the working face of the active landfill cell.

The movement to the working face is controlled by speed limits imposed by the facility operator. These speed limits should be adhered to at all times to limit the likelihood of
vehicle collision and other mishaps, such as waste spillage, vehicle damage, contamination of the facility, fire, and injury to Drivers and others.

**Safe Tip-Face Operation**

When arriving at the operational tip-face, Drivers of waste vehicles need to be aware of the following requirements:

a) follow any Driver Induction notices issued at the weighbridge;
b) follow any directions given by facility staff directing tipping operations;
c) always wear High Visibility garments and PPE in the vicinity of the tipping area;
d) restrict movement outside your vehicle to a minimum when at the tip-face;
e) DO NOT enter the waste compaction area off the hard stand;
f) comply with restrictions on the number of vehicles depositing waste at any one time on the hard stand at the tip-face (as restrictions apply in most circumstances);
g) comply with restrictions on the number of transfer trailers (semi-trailers) at the tip-face at any one time as these vehicles have a greater propensity to topple sideways during tipping operation;
h) vehicles exiting the site must go through the vehicle wheel wash facility;
i) strictly observe the No Smoking or Naked Flame rules on site; and
j) follow all directions given in an Emergency Situation.

*(Ref EMRC 13187 Driver Induction Notes for Red Hill Facility)*

**Plant Spreading and Compacting Operation**

The waste compaction operation takes place adjacent to the tipping area (hard stand). Waste movement and compaction is carried out by heavy plant designed specifically for this purpose. This type of plant operates on the tip-face spreading waste up and down the face. As with all large plant, this means the compactor operator may not see people (eg vehicle drivers) on foot who enter the compaction area. It is particularly hazardous for people on foot when this machine is reversing up the tip-face slope as the pedestrian is likely to be in the visual ‘Danger Zone’.

*Drivers should not enter the compaction zone at the tip-face for any reason.*
Other Operations Involving Plant

There are generally other operations taking place at landfill sites besides waste spreading, compaction and waste truck movements, and these include:

a) other crawler tractors or wheeled tractors working the tip face or moving material in other areas;

b) road/culvert maintenance and grading operations (graders);

c) dust suppression operations (water carts or tankers);

d) green waste chipping and composting (portable chipping, tub grinding and Trommel operation);

e) class 4 solid waste disposal (front end loaders & tip trucks of 10 to 30 tonnes);

f) screening (portable rock crushing and screening operations, tip truck operation);

g) transfer Station operation (forklift operation, small vehicle traffic, hook lift trucks);

h) recycle areas (forklifts and other smaller vehicles moving in and out of the site); and

i) site control vehicles (normally four-wheel drive vehicles fitted with radios).

Fire Control.

A Waste Management Site should have emergency procedures to cope efficiently with:

- medical emergencies;
- fire in the landfill;
- fire in landfill infrastructure (vehicle on weighbridge or other asset); and
- fire on / in waste vehicles.

There is a high level of fire risk in and on waste vehicles and waste facilities. Once a fire has started, unless suppressed quickly, the fire will likely take hold. Vehicles and/or the facility are at risk of being lost and the associated risk of harm to people in the vicinity may be high.

Given the nature and mix of waste vehicle loads and dumped waste materials, fire is a hazard that needs to be isolated to the immediate area if possible. If this is not achieved, the fire and any other associated chemical reaction will quickly spread and impact on the facility via:

- smoke inhalation;
- explosion hazards;
- environmental hazards;
- local pollution;
- traffic hazards;
- inconvenience to local residents; and
- loss of property.

These various fire effects could also lead to temporary closure of the site and to possible legal action from members of the public or government agencies.

To minimise the risk of fire, all vehicles, and mobile plant should carry at least one fire extinguisher suitable in size and type for the expected fire risk (as per AS 2444-2001-Portable Fire Extinguishers and Fire Blankets-Selection and Location).

All operators of waste transport and waste facility vehicles should be trained in extinguisher identification and correct operation to suppress and contain certain fires.
Extinguisher Maintenance

All fire extinguishers on mobile plant or in static installations should be serviced by a trained and authorised service agent who periodically inspects, tests and refills portable fire extinguishers in accordance with AS1851.1 - Maintenance of Portable Fire Protection Equipment, Part 1 Portable Fire Extinguishers and Fire Blankets.

Plant Refuelling

All vehicles and plant, regardless of the location, size or quantity of their fuel requirements, must be refuelled in such a way as to minimise the risk of:

- fuel spillage;
- refuelling fire dangers; and
- collision with other plant or equipment.

NB Plant must be shut down before refuelling takes place to minimize fire risks associated with this activity.
**Vehicle Fires**
Employers must develop an Emergency Response Plan for fire and other vehicle emergencies and communicate these to all vehicle operators as part of operator training and at appropriate refresher intervals.

If a fire breaks out in or on a waste vehicle travelling on the road or between pickup points, the employer’s emergency response plan should be implemented immediately. The plan should be designed to minimise risks to the safety and health of people in the vicinity, damage to the vehicle, and effects to the environment.

An example of a vehicle fire emergency procedure is set out below:

**Waste Vehicle Fire - Directions for Operator:**
If immediate danger to Driver:
- exit the vehicle if there is an immediate risk to life or immediate risk of serious injury;
- contact emergency services on 000 and keep people out of the area;

If no immediate danger to the Driver:
- drive the vehicle off the road to an isolated position (if safe);
- stop the vehicle, apply the handbrake, and chock the wheels if safe to do so;
- call 000 Emergency Services (Fire);
- take extinguisher/s off the vehicle and place nearby (if safe to do so);
- locate the fire source and type of fire (fire internal / external, in load, on truck);
- apply extinguishing agent to the fire if safe to do so (water spray for paper fire, Dry Chemical spray for oil fire, (see the Extinguisher Chart attached to the Emergency Response Plan)
- extinguish fire if possible and if safe to do so;
- if you cannot extinguish the fire, keep onlookers away from vehicle and up-wind from smoke;
- place traffic control devices around the truck (front, side rear of vehicle);
- advise your Supervisor;
- brief Emergency Services on the type and amount of waste which was on board prior to the fire starting. Be guided by the Emergency Services Officer-in-Charge (OIC).
- **DO NOT EMPTY THE WASTE LOAD FROM THE TRUCK.**

*The number one priority at all times must be the safety and health of the Driver and other people in the vicinity of the fire.*

**Waste Facility Fires**
Fire outbreaks in Waste Facilities must be dealt with under the Emergency Evacuation Response Plan and the Fire Fighting Procedures of the specific facility.

Possible sources of fire on Landfill sites include:
- landfill site (tip-face);
• bushland surrounding the facility;
• flammable liquid storage units;
• landfill gas extraction operations;
• plant and machinery; and
• green waste compost areas.

Staff, contractors and transport operators should, wherever possible and safe, contain fires to the immediate area of the fire outbreak using the appropriate extinguishing medium.

Failure to contain the fire is likely to result in significantly increased risk of harm to people, property damage, greater environmental pollution and general interruption to operations.

_The number one priority at all times must be the safety and health of people in the vicinity of the fire. Operators should always consider the risks and consequences of employees fighting fires (as opposed to having a procedure which promotes immediate evacuation and alerting emergency services)._  

### 6.1.3 Contract Recyclers (On foot)

Contract Recyclers, Salvage Contractors or Recyclers are all names given to people who are employed or contracted to sort through waste deposited at private or municipal tip-face type waste facilities.

These recyclers are generally not supervised at waste facilities. It is therefore important to minimise the risk to these people from accidents or near-miss events that have a high probability of injury.

Recyclers should receive adequate, training and supervision to reduce the risk of injury.

**Hazard Identification**

Hazards associated with tip-face recycling include:

- working in the vicinity of heavy plant/vehicles and not being seen by operators/drivers;
- no communication with drivers operating plant;
- working alone;
- flying objects associated with the compaction process;
- biological hazards;
- fire hazards;
- hazardous substances;
- sharps hazards;
- vermin and other pests;
- bio-aerosols; and
- fungi.

**Safe Work Practices for Tip Face Recyclers**

a) work only in the designated area at the tip-face;
b) keep a safe working distance from plant operating at the tip-face, at least 30 metres;
c) DO NOT work alone at the tip-face;
d) have net communication with operating plant (frequency selection matches mobile plant) and a means of communicating with others in the event of an emergency;
ed) wear appropriate Personal Protective Clothing (eyewear, boots, gloves, high visibility garments, etc);
f) undergo First Aid training and have access to a First Aid kit;
g) use washing and toilet facilities to ensure adequate hygiene standards;
h) be aware of traffic-flow in and out of tip-face and waste facility;
i) all accidents and incidents must be reported to the Site Supervisor; and
j) DO NOT move between vehicles at the tip-face hard stand.

6.1.4 Dealing with Toxic Atmospheres
Toxic atmospheres may be defined as atmospheres that contain substances which have the inherent ability to cause harm to the body or reduce the oxygen content of breathable air. Thus, a toxic atmosphere is any environment that presents a hazard to human respiration, whether it is in the open on a waste facility site, or in the confined space of a vehicle or plant cab.

There are varying factors which could result in toxic atmospheres where waste facility staff and operators of plant and waste vehicles are working. The most common factors include:
   a) hydrogen sulphide is formed in waste and is both highly flammable and toxic if inhaled;
   b) nitrogen oxide can be generated in processes and locations as intermediates or as rejected waste products;
   c) carbon dioxide may be produced from, or through, fermentation of waste products;
   d) carbon monoxide is produced by burning fossil fuels (as a by-product of oxidization);
   e) methane is a by-product of waste decomposition;
   f) sulphur dioxide is a by-product of decomposition;
   g) dust can be generated through handling or break up of dry waste or masses;
   h) asbestos exposure may occur through pick ups or deposits at waste sites;
   i) liquefied Petroleum Gases may be generated through waste pick up or compaction; and
   j) volatile Organic Compounds (VOC's) may be released by aerosols, paints, particleboard, plastics and pesticides.

The chart below shows, in percentage terms, how much oxygen is needed in any breathable atmosphere to sustain life. As oxygen decreases so does the ability to breathe and work within that environment.

Physical discomfort will be felt in oxygen deficient atmospheres of between 15 and 10 percent oxygen concentration.
### Oxygen Concentration and Symptoms

<table>
<thead>
<tr>
<th>Oxygen Concentration</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 %</td>
<td>None (normal oxygen level)</td>
</tr>
<tr>
<td>15 %</td>
<td>No immediate effects</td>
</tr>
<tr>
<td>14 %</td>
<td>Fatigue, impaired judgement</td>
</tr>
<tr>
<td>10 %</td>
<td>Dizziness, shortness of breath, deeper and more rapid breathing</td>
</tr>
<tr>
<td>7 %</td>
<td>Stupor sets in, i.e. can’t think straight</td>
</tr>
<tr>
<td>5 %</td>
<td>Minimum amount that will support life</td>
</tr>
<tr>
<td>2 % - 3 %</td>
<td>Death within 1 minute</td>
</tr>
</tbody>
</table>

*Diagram courtesy of WorkSafe WA PHYSIOLOGY OF RESPIRATION*

### Confined Spaces

Oxygen deficiency may occur within confined spaces such as within vehicles or in enclosed workplaces and may not be immediately noticed. The delay in the reduced levels of oxygen being detected, and action to evacuate the area or remedy the situation, may create significant risk to the health and safety of people working in the area.

Areas such as trenches and pits may also be confined spaces in certain circumstances.

Serious injuries, and in extreme cases death, can result if:
- the oxygen depletion is gradual and therefore the initial effects go unnoticed - this may result in slow onset of symptoms and when the symptoms reach a noticeable level, impairment may rapidly follow;
- a person enters a confined space with extremely low levels of oxygen, they may collapse almost immediately, thereby reducing the likelihood of the person being able to exit the area safely or raise the alarm; and
- the work performed within the confined space requires less exertion than the effort required to escape from the space – this may mean that by the time the employee realises there is a problem, they may not be capable of exiting the area.

### Safety Precautions

On the open surface of the waste site, toxic gases and fumes may be given off from accumulated waste, but they are usually quickly diluted and dissipated because of the large surface area of the site and the effect of prevailing winds.

A greater concern is the potential for a build up of toxic gases or fumes in the confined space of plant and equipment cabs operating on the tip face surface of the waste facility. The operators of heavy machinery, like compactors and tracked bulldozers, may be exposed to isolated pockets of toxic atmosphere on the tip face or in other areas of operation within the waste facility. This hazard may be reduced by the inclusion of vehicle...
cabin mounted charcoal activated air conditioning units and personal protective equipment.

The air conditioning units have a dual role for operators of plant, namely they:

- create a Positive Pressure System, minimising toxic gases and fumes from entering the confined space from outside the cab; and
- create a Thermally Controlled Environment for the plant operator.

The Personal Protective Equipment (PPE) provided to employees should be commensurate with the risk and type of hazard that has been identified. PPE which may be suitable could be:

- P1 or P2 Disposable Respirators (for protection against dust, asbestos fibre, solid particulate);
- full face respirators (for protection against specific chemical fumes, such as hydrocarbons);
- half face respirators;
- power pack respirators; and
- hearing protection.

All respirator cartridges used with the respirators mentioned above should comply with Workplace Australia Guide to Exposure Standards (WES).

All staff using respiratory equipment and associated PPE and who may have to work in possible toxic atmospheres need to be trained in:

- where the PPE is located;
- how to maintain the PPE;
- where it can be replaced if required;
- health requirements of wearing respiratory equipment;
- how to correctly fit a respirator;
- how to check for face seal;
- testing of respirator components;
- respirator maintenance requirements;
- use and limitations of the respirator equipment (i.e. absorption capacity);
- filter selection (type of cartridge/filter);
- how often cartridges need to be changed; and
- colour coding.

The following tables are extracts for guidance from; AS1715, 1994 - Selection, Use and Maintenance of Respiratory Protective Devices.

**Gas and Vapour Filters**

<table>
<thead>
<tr>
<th>Type</th>
<th>Colour</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Brown</td>
<td>Vapours of organic solvents (boiling point greater than 65ºC)</td>
</tr>
<tr>
<td>B</td>
<td>Grey</td>
<td>Acid gases (chlorine, hydrogen sulphide, hydrogen cyanide)</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
<td>Sulphur dioxide</td>
</tr>
</tbody>
</table>
General Classification for Filters

<table>
<thead>
<tr>
<th>Type</th>
<th>Class</th>
<th>Filter Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas &amp; capacity</td>
<td>1. (Disposable &amp; Cartridge)</td>
<td>Low (L) absorption</td>
</tr>
<tr>
<td>vapour</td>
<td>2.</td>
<td>Medium (M) capacity</td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>High (H) capacity</td>
</tr>
<tr>
<td>Particulates</td>
<td>P1</td>
<td>(L) - used for mechanically generated particulates</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>(M) - used for mechanically &amp; thermally generated particulates</td>
</tr>
<tr>
<td></td>
<td>P3</td>
<td>(H) - for all particulates, including highly toxic materials</td>
</tr>
</tbody>
</table>

The three main categories of air-purifying respirators include:
- gas filter respirators;
- particulate filter respirators; and
- combined gas and particulate filter respirators.

Filter respirators are available in various configurations with many combinations of face pieces and filters. Gas filters will not provide protection against dust, and dust filters will not provide protection against gas. In the context of respiratory protection, the term "particulate" refers to any solid or liquid particle suspended in air, including dusts, mists, smokes and fumes. The term "fumes" refers to particles resulting from the heating of a solid to such an extent that it vaporises, and then condenses into small particles in the surrounding air.

### 6.2 Transfer Stations

Transfer Stations serve two main purposes. One is to divert the highest practicable amount of waste from landfill sites through efficient recycling and in some cases re-use schemes. The other is to minimise the number of vehicles going to the tip face.
While older style Transfer Stations are normally built around elevated vehicle bays from where waste material can be unloaded into purpose made bins. An alternative system enables people to unload to the same level or where the tipping face is lower i.e. less than one metre.

Transfer Stations have areas set aside for disposal of household waste items such as:
- metals;
- paper;
- organic waste;
- glass;
- wood;
- LPG Cylinders;
- Class 4 solid wastes (asbestos); and
- others as marked on site.

6.2.1 Tipping Areas

For elevated tipping bays where the tipping face is 2 metres or more, edge protection or other control measures may be required in accordance with Division 5 of the OSH Regulations. Various strategies can be adopted to minimise the risk of people falling over the edge of the tipping level, and must address the specific risk either on their own or in combination. Common controls include:
- provision of physical barriers such as concrete kerbs, steel upstands, guard rails, and wire rope (these barriers need to cater for the varying heights of vehicles/trailers that will use the Transfer Station);
- provision of fall arrest systems (harnesses) to protect people working at the higher level;
- provision of supervision and signage which direct people to use the most appropriate tipping section for their vehicle;
- provision of general signage and rules of use of the facility that warn people of the possibility of a fall and prevent access to people who do not need to be in the area;
- tipping areas are regularly cleaned to ensure the edge can be clearly identified and that there are no tripping hazards; and
- there is a system to control dust.

Operators of waste management facilities must ensure that the prevention of falls from height is managed effectively and in accordance with the specific requirements of the legislation.

6.2.2 Vehicle and Plant Operators

All Transfer Bin Truck Drivers and plant operators must:
a) conduct a pre-start safety check;
b) not allow unauthorised people to ride in the cab;
c) be aware of axle/load capacity;
d) wear safety footwear and a high visibility garment at all times; and
e) ensure that the cab is kept clean and free from litter.

Operators should undertake a risk assessment in relation to the traffic management at Transfer Stations, particularly at large sites with frequent truck movements.
6.2.2 Safety of Transfer Station Staff

The following measures may assist in managing the risks to people working at the Transfer Station:

f)  safety footwear, high visibility garments and suitable eye protection are worn at all times when on site;
g)  appropriate gloves are worn when handling waste;
h)  ensuring adequate separation of cars and trucks in the waste receiving area via good traffic management;
i)  personnel (or the public) should not enter waste bays when collection bins are being removed and barriers to prevent access should be erected and removed as necessary;
j)  customers should receive clear directions for the tipping process and staff should monitor the movement and actions of customers to ensure safe disposal practices;
k)  customers should be directed to remain within their vehicle and to keep children in their vehicle at all times when on site;
l)  staff maintain the cleanliness of the site at all times and practice effective dust suppression;
m)  permanent and removable safety barriers and signage are in place wherever necessary;
n)  all machines are kept in good working order (and all equipment faults are reported) and employees are adequately trained;
o)  safety directions for identified hazards are communicated and enforced;
p)  all hazardous loads are redirected to suitable areas;
q)  traffic regulations are communicated and enforced; and
r)  delivery vehicle storage areas are provided for sites with high traffic volume and large volumes of waste.

6.2.3 Packer (Fixed)/Compactor Operators

Safety guidelines include:

a)  only suitably trained personnel should operate the plant;
b)  walkways should be kept clean and dry at all times;
c)  any refuse that drops to the floor when the container is separated from the compactor unit should be removed as soon as practicable;
d)  bin lifters should be left in the lowered position when not in use;
e)  ensure that people do not remain in the tipping area;
f)  ensure that the equipment is checked regularly, and defects are reported immediately;
g)  safety footwear and high visibility garments should be worn at all times; and
h)  suitable gloves should be worn when handling waste materials.

6.2.4 Transfer Station Safety for Visitors

To protect visitors and public customers at Transfer Stations they should be directed to:

a)  report to the Transfer Station Supervisor for instruction on where to deposit waste items and how;
b)  ensure children remain in the car at all times when on site;
c)  deposit waste in the correct area and bin;
d)  NOT ENTER the Danger Zone in front of the waste bin rails/barriers;
e)  allow a Safe Working Zone between them and the disposal face (this should be marked out);
f)  use gloves to handle waste; and
g) depending on site layout and materials to be received, follow dust control measures.

6.3 Material Recovery Facility

Material recovery or re-use facilities are the area of Waste Facility sites which further filter household waste that would normally be disposed of into landfill. These areas can be purpose built or an open space where facility staff can place recycled items that still have residual value. Common items include:

- white goods;
- furniture;
- gas bottles;
- bicycles; and
- paints.

6.3.1 Safety Considerations at Material Recovery Facilities

Many Material Recovery Facilities are open to the public and accessed on a regular basis. This means that frequent vehicle movement could be expected on these sites, especially during weekends and public holidays. Heavy site vehicles will also be used to transport items from the Transfer Station site to recycling and recovery areas on a daily basis.

6.3.2 Safe Work Practices for Material Recovery Facility Staff

a) PPE which has been provided must be worn when on site;
b) facility staff must wear all provided Fall Arrest Equipment when working near the disposal face of the Transfer Station bay (if applicable);
c) the site environment should be free of hazards and people when machines are operated, particularly when vehicles are reversing;
d) there should be adequate separation of cars and trucks in the waste receiving area;
e) do not enter waste bays when plant is removing waste from collection bins;
f) be aware of vehicles entering and leaving the Transfer Station;
g) monitor and direct public customers to promote safe disposal practices;
h) customers should receive clear direction and supervision when on site;
i) customers should be directed to keep children in their car when on site;
j) staff should maintain the cleanliness of the site at all times;
k) dust suppression must be maintained;
l) safety Barriers must be in place;
m) all machines should be maintained in good working order and faults reported;
n) Class 4 Waste Precautions must be communicated and enforced;
o) all hazardous loads should be effectively redirected to suitable areas; and
p) the site Emergency Evacuation Action Plan should be in place.

6.3.3 Safe Work Practices for Material Recovery Facility Visitors

a) visitors must report to the Transfer Station Supervisor for instruction on where to deposit waste items and how;
b) children should remain in the car and be supervised at all times;
c) waste must be deposited in the correct area and bin as directed;
d) DO NOT ENTER the Danger Zone in front of the waste bin edge;
e) allow a Safe Work Zone between you and the disposal bin edge;
f) do not stand too close to the disposal area; and
g) use gloves to handle waste.

Other issues which will require risk management at Material Recovery Facilities can include hazards associated with poor air quality, noise and use of plant.
6.4 Handling Household Hazardous Waste

The collection and management of domestic waste has the potential to pose various risks to employees handling these diverse collections. As hazardous waste from any source, including low volume household hazardous waste, poses potential risk if handled incorrectly, there are specific household hazardous waste collection services and processing sites.

Some potential hazards which may arise when employees are collecting household hazardous waste include:

- hazards associated with driving and operating collection vehicles;
- traffic management hazards;
- the manual handling associated with collecting/emptying of waste containers;
- exposure to biological and chemical agents within the waste;
- contact with corrosive substances;
- hazards associated with flammable liquids and flammable gases;
- exposure to poisonous substances and contact with unknown substances;
- the risk of spontaneous combustion and fire within the vehicle load; and
- exposure to toxic atmospheres.

These hazards can result in many types of injuries including eye damage, burns to the skin and respiratory problems.

Hazardous household waste is collected separately to divert dangerous items from the landfill waste stream. Typically, the collection process will be facilitated at a Recycle Station (facility), a mobile household waste collection point, or a Transfer Station.

Control measures to manage the risks associated with handling hazardous substances will vary depending on the situation and location where the hazardous substances are being collected and/or stored.

Some substances found in household waste may be particularly hazardous and may be carcinogenic or a severe irritant. These substances must be handled carefully and in accordance with the Acute Risk Dangerous Goods labelling system and relevant Material Safety Data Sheets.
Pictured below are some common Hazardous Substance labels depicted on products found in household waste. The table outlines the type of substance, an example of that type of substance, and a commonly used sign for that type of substance.

<table>
<thead>
<tr>
<th>Number</th>
<th>Type of Substance</th>
<th>Example</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EXPLOSIVE</td>
<td>Gunpowder, flares</td>
<td>![Explosive Sign]</td>
</tr>
<tr>
<td>2.1</td>
<td>FLAMMABLE GAS</td>
<td>LP gas, acetylene</td>
<td>![Flammable Gas Sign]</td>
</tr>
<tr>
<td>2.2</td>
<td>NON-FLAMMABLE NON-TOXIC GAS</td>
<td>Carbon dioxide</td>
<td>![Non-Flammable Non-Toxic Gas Sign]</td>
</tr>
<tr>
<td>2.3</td>
<td>TOXIC GAS</td>
<td>Chlorine gas</td>
<td>![Toxic Gas Sign]</td>
</tr>
<tr>
<td>3</td>
<td>FLAMMABLE LIQUID</td>
<td>Petrol, kerosene</td>
<td>![Flammable Liquid Sign]</td>
</tr>
<tr>
<td>4.1</td>
<td>FLAMMABLE SOLID</td>
<td>Firelighters, matches</td>
<td>![Flammable Solid Sign]</td>
</tr>
<tr>
<td>4.2</td>
<td>SPONTANEOUSLY COMBUSTIBLE</td>
<td>Carbon, white phosphorous</td>
<td>![Spontaneously Combustible Sign]</td>
</tr>
<tr>
<td>4.3</td>
<td>DANGEROUS WHEN WET</td>
<td>Calcium carbide</td>
<td>![Dangerous When Wet Sign]</td>
</tr>
<tr>
<td>5.1</td>
<td>OXIDIZING AGENT</td>
<td>Calcium hypochlorite</td>
<td>![Oxidizing Agent Sign]</td>
</tr>
<tr>
<td>5.2</td>
<td>ORGANIC PEROXIDE</td>
<td></td>
<td>![Organic Peroxide Sign]</td>
</tr>
<tr>
<td>6</td>
<td>TOXIC</td>
<td>Arsenic</td>
<td>![Toxic Sign]</td>
</tr>
<tr>
<td>7</td>
<td>RADIOACTIVE MATERIAL</td>
<td>Uranium</td>
<td>![Radioactive Material Sign]</td>
</tr>
<tr>
<td>8</td>
<td>CORROSIVE</td>
<td>Hydrochloric acid</td>
<td>![Corrosive Sign]</td>
</tr>
<tr>
<td>9</td>
<td>MISCELLANEOUS DANGEROUS GOODS</td>
<td>Dry ice, asbestos</td>
<td>![Miscellaneous Dangerous Goods Sign]</td>
</tr>
<tr>
<td>9.1</td>
<td>MIXED CLASS LABEL</td>
<td>For road transport</td>
<td>![Mixed Class Label Sign]</td>
</tr>
</tbody>
</table>

6.4.1 Safe Work Practices for Managing Risks When Collecting Hazardous Household Waste

a) a traffic management plan for drop off vehicles (mobile household hazardous waste collection point) should be implemented;
b) provision of manual handling devices should be considered to move heavy and bulky hazardous items;
c) segregation space for different classes of hazardous waste may be appropriate;
d) clearly marked and separately allocated bins to contain different classes of hazardous waste items may reduce congestion and confusion;
e) labelling of bins holding collected hazardous waste should eliminate risks associated with mixing substances;
f) clear directions and adequate training should be provided for staff working with and receiving household hazardous waste;
g) erect signage outlining what substances and items of household hazardous waste will be accepted at the facility and directions for disposal of other items;
h) erect signage outlining what quantities of household hazardous waste will be accepted at the facility and directions for disposal of other items;
i) provide suitable Personal Protective Equipment (PPE) and clothing for staff at the collection point, handling and storage areas;
j) implement and practice an Emergency Containment and Evacuation Procedure;
k) facilitate access to a Spill Containment Kit for emergency use and training in its use;
l) movement of bulk hazardous substances by road needs to have appropriately labelled vehicles with segregated loads (mobile household waste collection);
m) hygiene facilities should be available at static and mobile collection points;
n) a suitable quantity of water should be available for emergency use should a spill occur;
o) a suitable First Aid kit and trained staff should be available at static and mobile collection points;
p) an effective communication procedure should exist for mobile and static communication points to obtain emergency directions and assistance;
q) a qualified hygienist or health expert should be engaged to provide assistance and advice in managing health related matters associated with mobile hazardous household waste stations;
r) ‘No Smoking’ signs should be posted at strategic points around the static or mobile collection station and this policy should be enforced;
s) employees must be trained and reminded frequently about the importance of hygiene when handling hazardous substances; and
t) training in working with chemical hazards must be provided to all staff involved in the handling of hazardous substances.

6.5 Plant Maintenance
The employer, main contractor, or self-employed person must ensure that maintenance, servicing and testing of the plant used at the facility is carried out by a competent person on a regular basis. This should be in accordance with the requirements of the manufacturer and/or designer of the plant or equipment used for refuse compaction, transportation or disposal.

6.6 Drum Muster Process
DrumMUSTER is the National program for the collection and recycling of empty, cleaned non-returnable agricultural and veterinary chemical containers.

The types of containers collected can vary from small plastic containers through to plastic 20 litre containers and steel 205 litre drums.

DrumMUSTER is part of a national program involving:
- the reduction of the amount and type of packaging that produces such waste;
- increasing the use of single trip containers;
- increasing the recycling of these containers;
- the development and implementation of collection and recycling systems;
- the development of new technologies for delivering and applying agricultural chemicals; and
- improving occupational safety and health and environmental protection in mainly rural areas.

6.6.1 Hazard Identification and Management of Risk
Hazards which have been identified in relation to this program include:
- noise;
- fire risk;
- vibration;
- exposure to hazardous substances;
- exposure to sharp objects;
- poor manual handling practices; and
- machinery hazards due to operation of the equipment.

People handling drums under the DrumMUSTER program must carry out their work on the basis of the assumption that there is residue material in the drums. This means that safety procedures must be developed to reflect the hazards associated with handling drums which contain the items and substances for which they were used prior to disposal.

Appropriate Personal Protective Equipment (PPE) may include:
- suitable eye protection for the substances involved;
- nitrile gloves;
- steel-capped footwear; and
- suitable clothing/aprons.

Material Safety Data Sheets (MSDS) should be kept with the products involved and must be referred to in order to ensure that the PPE being worn is providing an adequate level of protection.

Customers are required to thoroughly rinse and empty drums prior to disposal in accordance with environmental and safety requirements on the relevant MSDS.

The DrumMUSTER Process involves a number of machines once the drums have been collected by the waste management operator. These include:
- Washers;
- Fillers;
- Transfer machines;
- Crushers; and
- Piercers.

The Process can involve a number of different types of trucks and load shifting plant. All plant associated with the DrumMUSTER must be maintained and operated in accordance with the manufacturer’s directions and to acceptable safety standards.

6.7 Landfill Gas Collection

Landfill gas collection is a common practice at waste landfill sites and uses biomass-derived methane to produce useful energy. The process consumes methane and reduces the risk to the environment that would otherwise result from natural decomposition. Biogas is usually about 55-60% CH₄ (methane) and 40-45% CO₂ (carbon dioxide).

In many cases, there is also a power generation unit owned and operated by an outside contractor in a section of the landfill site with restricted entry. This unit generates electricity using the biomass-derived methane fuel.

To move biogas from the ground requires a minimal negative pressure in the collection pipework.
6.7.1 Hazard Identification and Management of Risk

Possible hazards associated with the process of collecting biogas are:
- fire and explosion as methane is explosive in certain concentrations in air; and
- asphyxiation as high concentrations of carbon dioxide are toxic even when enough oxygen is available for breathing. This is because air containing 4-5% CO₂ leads to unconsciousness and concentrations of over 9% will cause death within minutes.

*Material Safety Data Sheets are the primary source of health and safety information about methane and carbon dioxide.*

The hazards posed by extracting and using gases may be minimised by:
- a) ensuring that all dangerous goods are removed to a safe distance from any outlet or gas treatment facility;
- b) consideration is given to the location or accumulation of any gases heavier than air that may pose a hazard;
- c) consider the prevalent wind direction when locating other dangerous substances;
- d) suitable breathing apparatus should be provided;
- e) emergency procedures should be implemented and practiced;
- f) air quality monitoring and testing should be performed;
- g) appropriate alarms associated with devices to detect unacceptable levels of biogas/methane should be installed and maintained;
- h) buildings in the vicinity should be constructed so as to ensure that there can be no build-up of biogas.
- i) adequate safety procedures for handling gases should be in place supported by appropriate training;
- j) all staff who may be exposed to gases should receive regular medical checks; and
- k) safeguards should be in place during commissioning and de-commissioning operations.
7.0 KEY GENERIC SAFETY ISSUES

7.1 Falls from Heights

Injuries related to slips, trips and falls may occur in the waste management industry if risks associated with the nature of the work and the features of the workplace are not managed. Falls from height can be serious because of the high potential of significant or fatal injury. Activities and work site areas which, if not managed effectively, may give rise to a risk of injury due to a fall from height include:

- transfer station unloading bays;
- mobile recycling facility unloading bays with elevated sorting cabins and access stairs;
- use of mobile plant (particularly maintenance activities);
- use of stationary plant and structures;
- excavations for burying waste;
- use of access ladders; and
- trucks with unstable loads.

While not strictly a “fall from height” situation, the existence of steep slopes associated with landfill excavations or stockpiles may also pose a hazard for people such as litter pickers who work in these areas.

7.1.1 Hazard Identification and Management of Risk

Employers should identify the circumstances in which a worker could fall from a height and assess the likelihood of the fall and the severity of potential injuries. Matters that may contribute to a fall occurring and/or the severity of the consequences may include:

- impact of a vehicle (ie pedestrian hit by a vehicle);
- poor lighting;
- slippery surfaces;
- unsuitable footwear;
- poor access and egress to a particular area; and
- strong winds.

Some risk control measures could include the following:

- fall arrest equipment;
- use of scaffolding and/or raling;
- use of fixed ladders;
- appropriate PPE (Personal Protection Equipment);
- re-design of fixtures;
- modify procedures or work process;
- training in fall from height hazards, and use of relevant equipment such as fall arrest gear; and
- provision of appropriate supervision or extra workers to assist with tasks.
Job Safety Analysis (JSA)
It is recommended that a JSA is carried out for any work situation where the worker is going to be 2 metres or more from the next level or ground.

A Safe Work Procedure should be developed and implemented where the risk is significant.

Personal Protective Equipment
There are various types of PPE available and some of these are referred to in the following Australian Standards:

- AS/NZS 2626 - Industrial Safety Belts and Harnesses, Selection Use and Maintenance;
- AS/NZS 1891.1 - Industrial Fall-Arrest Systems and Devices, Safety Belts and Harnesses
- AS/NZS 1891.2 - Industrial Fall-Arrest Systems and Devices, Horizontal Lifeline and Rail Systems;
- AS/NZS 1891.3 - Industrial Fall-Arrest Systems and Devices, Fall Arrest Devices;
- AS/NZS 1891.4 - Industrial Fall-Arrest Systems and Devices, Selection Use and Maintenance; and
- AS/NZS 4389 - Safety Mesh.

Hard hats, gloves, safety boots, and eye protection should also be considered, along with the above listed specialised equipment.

References for Plant and Equipment specifications can be found in:

- AS 1657 - Fixed Platforms, Walkways, Stairways and Ladders – Design, Construction and Installation; and

Reducing the risk of falls through engineering controls, such as better designed plant, is preferable to managing risks with PPE alone.

7.2 Hazardous Substances

7.2.1 General References
There are two broad groups of substances which pose chemical exposure hazards to people working with them:

- “dangerous goods” are products, substances or articles that are listed in the Federal Transportation of Dangerous Goods Regulations; and
- “hazardous substances” are any materials that pose a threat to public health and/or the environment. Typical hazardous substances are materials which are toxic, corrosive, ignitable, explosive or chemically reactive.

The primary hazards in handling dangerous goods and hazardous substances are related to spillage, incorrect use and handling, and over-exposure.

Below is a list of the signs that are required to be displayed on containers holding dangerous goods:
Class 1  EXPLOSIVES
Class 2  GASES
Class 3  FLAMMABLE LIQUIDS
Class 4  FLAMMABLE SOLIDS
Class 5  OXIDISING AGENTS
Class 6  POISONS
Class 7  RADIOACTIVE MATERIALS
Class 8  CORROSIVES
Class 9  MISCELLANEOUS
DANGEROUS GOODS

7.2.2  Requirements of the OS&H Regulations

Part 5 of the OSH Regulations carries many legal requirements for manufacturers, suppliers, importers, employers and others who handle hazardous substances.

Employers have a duty, so far is reasonably practicable, to remove or reduce the risks associated with hazards at the workplace. In relation to hazardous substances this includes:

(a) making a **MSDS** (Material Safety Data Sheet) for each hazardous substance readily available to any people who might be exposed to the hazardous substance at the workplace;
(b) labelling all containers in which a hazardous substance is held at the workplace in accordance with the requirements of the *National Code of Practice for the Labelling of Workplace Substances* [NOHSC: 2012 (1994)].
(c) establishing and keeping current, a readily accessible register of each hazardous substance used in the workplace and ensuring that the register contains (as a minimum) a list of each hazardous substance used from time to time at the workplace and the MSDS for each hazardous substance;
(d) assessing the risk of injury or harm occurring to a person as a result of exposure to a hazardous substance at the workplace;
(e) identifying each hazardous substance used at the workplace and reviewing the MSDS or consumer label for each hazardous substance used at the workplace;
(f) identifying any likelihood of injury or harm occurring as a result of exposure to each hazardous substance used at the workplace;
(g) ensuring that each person who is likely to be exposed to a hazardous substance at the workplace receives, before commencing the work, relevant and adequate information and training on:
   ▪ the potential health risk and any toxic effects associated with the hazardous substance;
   ▪ the control measures used to minimise the risk to safety and health;
   ▪ the correct methods used to minimise adverse effects of exposure to the hazardous substance;
   ▪ the correct care and use of personal protective clothing and equipment; and
   ▪ the need for, and details of, health surveillance.
(h) keeping records of all hazardous substances inductions and training undertaken.

7.2.3 Hazard Identification and Management of Risk
There is a wide range of hazards associated with different chemicals. The extent of the hazard is usually a function of how the chemical can get into the body and what impact it will have.

Some chemicals can be lethal within minutes or hours, while others may slowly build up in the body over years, to the point where chronic symptoms start to appear e.g. headaches and nausea.

When the contents of a bottle, container, drum or can are unknown, it should be treated as a high risk product. All significant amounts of hazardous substances need to be identified and registered where practicable, this includes:
   • Batteries;
   • gas cylinders;
   • paints and thinners;
   • herbicides; and
   • pesticides.

Segregation
Ensure that hazardous items are stored and bundled correctly and are kept away from incompatible materials.

Bunding
Wherever practicable, bunding must be provided to prevent contamination of the soil and water table. (See picture above).

Personal Protective Equipment & Clothing
Personal Protective Equipment (PPE) and clothing must be used as required. The MSDS for each chemical sets out the PPE & clothing to be used. PPE & clothing must be used, cleaned and stored correctly to ensure the protection of the relevant workers and to provide good hygiene standards.
NOTE: Wherever workers are required to handle hazardous substances on a daily basis, eye-wash facilities should be made available. As a minimum, this would include proprietary First Aid squeeze bottles in a hygienic location or ideally a plumbed Deluge Eye-wash Station.

7.3 Manual Handling

Manual Handling has been defined as “any activity requiring the use of force exerted by a person to lift, lower, push, pull, carry or to move, hold or restrain a person, animal or thing.”

(The WA Manual Handling Code of Practice (1996, p. 2)

Manual handling is prevalent in the waste management industry in the form of lifting, moving, holding or restraining loads, and these activities can result in sprain and strain type injuries, if care is not taken. Waste collection and recycling involves manual handling, particularly where bins are manually carried or wheeled to the collection vehicle and is the handling of cardboard bales onto the back of trucks.

The OSH Regulations require employers to:
- identify hazards likely to arise from manual handling;
- assess the risk of injury or harm resulting from each hazard; and
- consider means of risk reduction.

The means of reducing the risk of manual handling injuries in relation to waste collection can include:

a) substituting manually emptied bins with mechanical lifting systems as part of a “no lift” policy;
b) limiting the size and laden weight of bins that have to be manually wheeled over gradients or rough surfaces. Initial push/pull forces should be kept below 21kg for one person, and a sustained push/pull force should be less than 12kg;
c) limiting the capacity of manually lifted bins to 80 litres. A laden 240 litre MGB should not be manually lifted under any circumstances;
d) ensuring sufficient staff or team lifting and/or suitable mechanical aids are available to lift bulky waste items such as tree prunings and refrigerators;
e) modification of buildings and paved areas to reduce gradients, gutters and bumps over which large bins have to be wheeled and filling of pot holes where practicable;
f) the provision of street litter bins with handles which are easy to grasp with a gloved hand;
g) the design of street litter and recycling collection systems so that loads can be handled between mid-thigh and shoulder height;
h) warming up and stretching prior to any manual handling;
i) redesigning work practices to incorporate safe work rates, varying tasks and providing regular breaks for repetitive tasks;
j) having adequate staffing at peak demand periods and provision of suitable work practices for workers with special needs;
k) promoting client understanding and compliance with the limits of the waste collection service, such as size and weight limits, types of materials that will be collected, and locations from which waste will be collected;
l) modifying the layout of the workplace to ensure that the object being handled is readily accessible and does not require the employee to stoop or rely on manual handling to transfer load into a vehicle. The provision of adequate lighting should also be considered;
m) provide information, instruction and training relating to the employer's policies and procedures for the handling of waste/recycling bins and items to all relevant employees. Information should include the importance of non restrictive clothing.

REFERENCES:


7.4 Safety Signage

Safety signage which should comply with Australian Standard 1319-1994, sets out requirements for the design and use of safety signs intended for use in the occupational environment. The purpose of the signage is to regulate and control safety related behaviour, to warn of hazards and to provide emergency information including fire protection information. The following signs are examples of signs that may be seen in the workplace:
These are safety signs which may be posted within the waste management industry to help identify workplace procedural issues or to remind operators of the hazards that may exist when operating machinery. (See Appendix 3 for further Safety Signs used on refuse collection vehicles).

7.5 Heat Stress

Heat Stress occurs when heat is absorbed from the environment faster than the body can process it. The resulting strain on the body comes from the combined contributions of the physical activity, environmental factors such as air temperature, humidity, and air movement and personal factors such as the extent of the person’s hydration and acclimatisation. Heat Stress can cause increased sweating, tiredness, irritability, inattention and muscular cramps.

7.5.1 Heat Stroke

In most severe cases, the body’s temperature control system breaks down altogether and body temperature rises rapidly. This condition is termed Heat Stroke and can be fatal. Symptoms of Heat Stroke include:

- staggering walk;
- mental confusion;
- hot skin;
- convulsions;
- unconsciousness;
- incoherence; and
- delirium.

7.5.2 Methods to prevent Heat Stress

a) Engineering Controls: these include reducing the radiant heat load by providing shade in outdoor work areas such as canopies or awnings over the work area, segregation of hot work processes from employees and using power tools for minimising muscular activity.

b) Work Practices: these measures include altering the work schedule so that heavier work is done during cooler periods, instituting formal work breaks, job rotation and education of employees in safe work practices and measures to reduce the risk of heat stress. Providing air conditioned sheds or vehicles for rest breaks is also useful.
c) Protective Clothing and Equipment: protective clothing should be chosen with regard to its contribution to preventing any adverse effects of heat, particularly where it limits convective or evaporative cooling, and may be required against heat itself. Employers may provide sunscreen, a wide brimmed hat and loose, long, lightweight, light coloured cotton clothing which provides best air circulation and cooling, while still protecting from the sun. See Regulations 3.32, 3.33 and 3.34 in relation to the provision of Personal Protective Equipment.

d) Administrative Controls: appropriate climate control in Transfer Stations, MRF’s, machinery and trucks;

e) Worker Factors: these include such factors as incomplete acclimatisation, dehydration or poor diet. A good quality water supply should be maintained close to the area where work is being conducted and consumption should be encouraged. Frequent small drinks of water will help replace the water lost to the body through sweat. Alcoholic drinks should not be taken as replacement fluids. Medical advice should be sought if working in hot conditions and workers should also be screened for heat intolerance.

Note: alcohol stimulates the body to eliminate fluids, and will increase the risk of dehydration. Medication taken for medical conditions such as heart problems, diabetes and tranquillisers may also cause impaired temperature regulation. Other conditions such as advancing age, being overweight, poor physical fitness and tiredness can also interfere with temperature regulation. Care should be exercised in the use of salt. Only upon medical advice should salt supplements be taken.

REFERENCES:


7.6 Biological Hazards (includes management of sharps)

Biological hazards include viruses, bacteria, parasites, fungi, and other organisms. Some biological hazards, such as HIV or Hepatitis B are potentially life threatening.

7.6.1 Biological hazards including Hepatitis B, Hepatitis C and HIV/AIDS

Sources of infection:

a) cleaning of plant used for waste collection may present a biological health hazard;

b) blood and body fluids from persons who are infectious carriers of disease. Infection could be by way of exposure or contact with material which has been contaminated with infected blood products, bodily fluids or tissue, such as sanitary waste, toxic, human and liquid wastes, soiled linen and used needles/sharps;
c) gastroenteritis and Hepatitis A may be spread from faecal contamination of hands, food or other objects which enter the mouth and digestive tract;  
d) Ross River Virus and other diseases spread by mosquitoes, flies, rats and other vermin which may live in and around waste.

Management of the Risk:

a) all plant used in waste collection should be designed to minimise crevices and corners. Adequate clearances should be provided to allow access for maintenance, cleaning and for personnel to effectively clean all areas of the machine without being exposed to biological hazards.

b) toxic human, medical and liquid wastes are normally handled by specialist equipment, however, there is a possibility that needles/sharps and associated risks may be present in domestic and commercial refuse and procedures to handle these items safely should be implemented;

c) where there is a risk of contracting Ross River Virus or other mosquito borne disease, consideration should be given to mosquito control programs (misting), protective clothing and other methods to limit exposure to insect bites:

d) a high standard of personal hygiene is essential to minimise the risk of harm from biological hazards such as viruses, bacteria and fungi. Arms and hands must be washed after contact with refuse and before eating, drinking and smoking. Frequent hand washing and good hygiene, as well as wearing gloves, are paramount. Protection of the skin, proper handling of sharps and other items contaminated with blood and body fluids should also be done to minimise the risk of infection.

e) clothes worn during waste collection should be washed, cleaned or renewed as frequently as necessary to protect the health and safety of the wearer. Where appropriate, gloves should be provided for use by workers and disposed of after use. (See AS 2161.2 - Occupational Protective Gloves for further information);

f) reference should be made to the Safe Work Australia National Code of Practice for the Management of HIV/Aids and Hepatitis at Workplaces when developing hygiene and infection control policies and procedures;

g) unprotected wounds may allow the entry of infection. Sometimes, cuts and puncture wounds may allow life threatening infections such as tetanus and bacteria to enter the body. All wounds and cuts to the hands should be protected by waterproof dressings and disposable waterproof gloves should be worn over the top of the dressing;

h) Hepatitis B, Hepatitis C and HIV/AIDS can also gain entry through puncture wounds to the skin or contact with mucous membranes of the eye or mouth. The occupational risk of contracting these diseases in this manner is low in most waste management processes. Infection could occur where a worker’s skin is penetrated by a contaminated syringe or other ‘sharps’ type item. There is a need for special caution whenever workers may come into contact with sharp objects (‘sharps’) which could be contaminated by human body fluids;

i) where there is a risk of exposure to Tetanus or Hepatitis B, inoculation programs for employees at risk should be considered; and

j) where appropriate, training should be provided, in relation to infection prevention and control, hygiene precautions and standards, safe handling, exposure to and disposal of needles/sharps and contaminated waste. Training should also be provided about personal protective equipment to be worn such as gloves, masks, eye shields or goggles. Spill management and clean-up procedures, incident
reporting procedures and legislative requirements should also be included in the training.

7.6.2 Procedure for a Needle Stick or Cut Injury

a) if safe to do so, place the needle in an enclosed container so further injury does not occur and to allow for testing of the needle and syringe contents (if any);
b) wash area gently with soap and water;
c) apply bacterial wipe or antiseptic wash;
d) cover with sterile dressing;
e) contact local doctor or hospital if a skin penetrating injury occurs. A Medical Practitioner should be consulted on the need for tetanus immunisation or a booster. A medical practitioner should also be consulted following a needle stick injury to determine the need for blood screening for disease. The risk of Hepatitis B, Hepatitis C or HIV/AIDS should be carefully assessed, appropriate tests should be carried out, and the person who incurred the injury counselled by a Medical Practitioner;
f) report and record the injury; and
g) dispose of the needle in an approved container after testing.

All persons involved in waste collection and recycling should be trained in the safe work procedure for minimising exposure to infection and disease and should be aware of the action to be taken following the identification of needle stick hazards or a needle stick injury. Procedures should also be developed and implemented for when hand washing facilities are not available, such as the use of antibacterial wipes.

7.6.3 Procedure for Disposal of Sharps/Needles

In general, disposable needles should not be removed from syringes or other appliances, nor should they be recapped unless a specific safety device is available. The clipping, bending or breaking of needles without the aid of an approved protective device is a high risk practice as it can lead to injury. Sharps must be placed in a designated and appropriately labelled ‘sharps’ container directly after being collected. The design and construction of the container must reduce the possibility of injury to handlers during collection and transport of sharps for disposal. Sufficient sharps containers must be provided and strategically placed so as to minimise the distance sharps are carried to the disposal point.

REFERENCES:

7.7 Visitor Safety

Ensuring that visitors to a workplace are not exposed to hazards is a significant legal responsibility for site management or those who control the workplace.
Visitors must be advised of their rights and responsibilities, especially in the case of any emergency. Directions which clearly and concisely inform visitors (and staff) of various site procedures which must be followed should be established. Where practicable, the various site requirements for a visitor should be conveyed to them before they come onto site.

Visitors should be advised of the names and contact details of people who can help in the case of any emergency. Where the visitors include children, special care needs to be taken to ensure that there are adequate levels of supervision by parents, guardians or others. Staff should be extremely diligent in the way they deal with children. Employers should develop and implement Visitor Management Policies which address the behaviour of employees when dealing with visitors and children on site. This policy may include such issues as:

a) pets (animals) should not be brought onto the site;
b) depending on how long the ‘in-the-field’ portion of a visit is to last, some consideration should be made regarding the supply of drinking water and the provision of First Aid supplies.
c) As some adults do not have a good command of English and pictorial symbols should be used wherever appropriate;
d) the reaction by visitors to instructions may be contradictory or even violent. Care must be taken to ensure that all requests and directions are clear and polite. Staff should never argue with a visitor, and call for help as soon as it appears that the situation may be getting out of control;
e) staff are required to ensure that traffic control is adequate, that the means of emergency escape are clear (where relevant), and that directions are easy to understand and follow;
f) visitors should be chaperoned at all times and should wear the same personal protective equipment as required of staff, in particular, eye protection and high visibility garments. Note: contractors in effect, are visitors, and whilst not always requiring a chaperone, must wear the same PPE as employees in that particular work location; and
g) visitors need to be informed of heavy vehicle movements which may be relevant to their activities and the hazards and control measures which are present.

7.8 Fatigue Management

7.8.1 What is fatigue?
Fatigue is a general term used to describe the feeling of being extremely tired, drained, or exhausted. Fatigue significantly affects a person’s ability to function normally and may be due to mental, physical or emotional reasons.

7.8.2 Causes of Fatigue
Fatigue can be the result of a number of factors in the workplace or a person’s private life. Some examples include:
- long arduous work;
- physical requirements of the job;
- irregular and unpredictable hours;
• continual noise exposure;
• workplace climate e.g. too hot or cold;
• continual vibration from equipment;
• shiftwork;
• constant concentration on a fixed or moving point; and
• working in isolation.

7.8.3 Effects/Indicators of Fatigue
The most common effects associated with fatigue are:
• desire to sleep;
• lack of concentration;
• memory loss;
• slowed reaction time;
• irritability;
• headaches and general body aches;
• mood swings;
• reduced physical strength;
• reduced hand-eye coordination;
• loss of appetite and reduced immunity; and
• blurred vision.

These symptoms can lead to poor judgement and increased error rates. Fatigue affects the ability to think clearly, which is vital when making decisions involving risk. All of the above effects are relevant to the waste management industry. Not only do these effects decrease productivity, but they simultaneously increase the potential for accidents and injuries to occur. People working in a fatigued state may place themselves and others at risk, particularly:
• when operating machinery (including driving vehicles);
• when performing critical tasks which require a level of concentration; and
• when the consequence of an error is serious.

7.8.4 Strategies to Manage Fatigue in the Workplace
Controlling fatigue in the workplace requires cooperation between employees and employers. Prevention is the best form of control, however there are a number of factors which can cause fatigue, and not all of them are work related. Adopting a systematic approach to identifying, assessing and controlling fatigue related hazards at work can be assisted by:

7.8.4.1 Providing Safe Systems of Work
a) Scheduling and work flow: make sure there are adequate rest breaks so that employees do not experience fatigue. Ensure work schedules, work loads and timelines are manageable.

b) Rostering of employees: define the task and select the people best suited to meet the required outputs. Ensure, where possible, that shifts are rotated and sufficient time off is provided between shifts. Number and length of shifts should also be monitored.

c) Presenting for work: ensure employees are able to work safely. Employees should be made aware that factors in their personal life can impact on their level of fatigue
and their capacity to work safely. If an employee is fatigued, encourage them to notify their Supervisor who will consider temporary measures to manage the issue.

d) Health: an employee's health and fitness are contributing factors to their level of fatigue. The employer may provide healthy lifestyle information to encourage and promote personal health and fitness of employees, and should provide support for work related issues. Confidential support through an Employee Assistance Program can assist with emotional and personal issues.

e) Responsibilities: an effective fatigue management system will identify, define and communicate responsibilities in relation to identifying, reporting and managing fatigue related hazards.

f) Documentation and Records: work schedules, rosters and records of hours worked should be documented and retained as part of good management practice.

g) Incident Management: fatigue should be considered as a contributing factor when investigating incidents. Investigations should be recorded and assessed to determine unsafe practices and prevent future injuries and damage.

h) Manual Handling: the prolonged performance of repetitive tasks may result in musculoskeletal injuries and occupational overuse syndrome. Workers involved in repetitive manual tasks should have regular breaks to avoid muscle and general fatigue.

7.8.4.2 Safe Work Environment
Safe and suitable workplace conditions help reduce fatigue. This may include having equipment and facilities designed to Australian Standards that meet the requirements of the OSH Act. Special consideration should be given to the impact of extremes in heat and cold, tasks requiring a high degree of concentration, working hours, and stressful situations. Facilities to promote health, fitness and rest should also be available where appropriate.

7.8.4.3 Training and Education
Training in the management of fatigue should include:
   a) the meaning of fatigue;
   b) how to identify fatigue;
   c) common causes of fatigue;
   d) potential health and safety effects of fatigue;
   e) how to manage fatigue;
   f) the workplace system for reporting and managing fatigue;
   g) responsibilities of employees; and
   h) general health and lifestyle issues.

7.8.4.4 Administrative Controls
Examples of administrative controls that may be used to manage fatigue include:
   a) sufficient supervision, particularly during high risk periods, such as night work, and during hazardous activities;
   b) contingency plans if workers become fatigued. This may involve removing workers from high risk work activities, such as operating machinery;
   c) effective emergency responses;
   d) procedures and controls for hazardous work during high risk periods; and
e) job rotation of repetitive and monotonous work that involves heavy physical demand and/or high levels of accuracy and concentration.

REFERENCES:

7.9 Traffic Management

Whether it be on a public road or on-site, the movement of vehicles is an integral part of the waste management industry. Accidents associated with vehicle movements are mainly of three types:
1. vehicles hit other vehicles;
2. vehicles hit people; and
3. vehicles impact with the ground (roll-over) or a fixed object.

The issue of traffic management can influence the likelihood of all three types of accident, although it is mainly relevant to the first two. While the information below deals with the driving environment, the health status of Drivers and their level of training are always of relevance. Wherever it is practical to do so, it should be ensured that all people on site are formally certified to drive and operate their vehicles and plant.

7.9.1 Vehicles Hitting Other Vehicles

This may occur as:
1. part of a reversing manoeuvre;
2. a head on collision; or
3. a right angle collision at an intersection.

Note: Passing manoeuvres could also cause collisions to occur, however these should not be common on a land-fill site but may occur on a public road.

Risk control measures for reversing manoeuvres include:
1. avoid having to reverse at all, e.g. small waste trucks picking up bins in car parks should move the bin to the truck;
2. use the rear-vision mirrors often;
3. if there is a major visual shadow (also known as a blind spot or Danger Zone) at the back of the truck, consider installing a video camera; and
4. in tight and congested areas a spotter should be used to give feedback/guidance to the Driver about where they are backing.

Risk Control Measures for avoiding on-site head-on collisions include:
1. wherever practicable have a one-way road system;
2. the vehicle speed should always be matched to the conditions i.e. a slower speed is more appropriate when visibility is poor, surfaces are slippery, slopes are steep and loads are heavy;
3. road width should be in keeping with the road’s function and the vehicles using them. For normal vehicles, all roads should be at least 7 metres wide;
4. avoid having intersections (where practicable);
e) at intersections one road should always have a STOP sign;
f) install signage such as warnings that an intersection is coming up; and
g) operating to the site speed limit or even slower at an intersection.

The three main rules of Traffic Management are:

a) Drivers need to know where they are going i.e. need for adequate directional signage;
b) Drivers should be able to see where they are going. The sight distances should be maximised where practicable i.e. there should not be an intersection close to a blind corner; and
c) where there is a change in the road condition, Drivers need to know about it as early as possible so that they have time to react effectively.

The two critical issues which impact on traffic safety at waste management sites are vehicle speed and sight distances.

7.9.2 Vehicles Hitting People

Risks to pedestrians at waste management sites can be significant if traffic management is not effective. This is because heavy plant and large trucks are involved, and because there are often people on the ground, such as truck drivers opening their tailgates or people emptying their trailers.

The problem with large vehicles is that they often have large blind-spots (visibility “shadows”) and if people find themselves in these areas they could be in danger of being hit. Large vehicles should therefore have an audible reversing alarm.

Some vehicles have very small turning circles compared to their size (e.g. Front End Loaders and Landfill Compactors) as they are articulated in the middle of their chassis. A person on foot should never approach a large truck or item of plant until they have caught the attention of the Driver or until they have made eye contact with the Driver. Under normal operating arrangements the separation distance between people on foot and large plant should be a minimum of 10 metres.

7.9.3 Vehicles Toppling Over

There are a number of vehicles in the waste management industry which because of their design are at greater risk of toppling over. That is because they have a higher than ideal centre of gravity.

Risks associated with these vehicles should be identified, assessed and managed via safe work procedures.

Taking corners at excessive speed can lead to a vehicle toppling over.

Operation of some vehicles on slopes, when operating tailgate mechanisms and when depositing refuse may also pose a toppling risk.

7.9.4 Forklifts
Forklifts are often used within waste management operations. Due to its ability to change its centre of gravity, its three point suspension, and the fact that some loads can shift whilst on the tines, the forklift is a vehicle which may be prone to toppling over if not operated competently. Accidents involving forklifts can result in serious injury or death.

To meet legal obligations, it is essential that Drivers of specialised vehicles/plant receive formal training to National standards and are licensed. All forklift operators must hold a National High Risk Work Licence with the appropriate endorsement.

**Mandatory and useful references** relating to the use of vehicles include OSH Regulations Part 3, Division 1- Reg. 3.22, and WorkSafe Guidance Notes – Safe Movement of Vehicles at Workplaces and Working Safely With Forklifts.

### 7.10 Working in Confined Spaces

Steps must be taken to eliminate or control hazards where a person may be required to enter or work in the body cavity of plant used in waste collection. The risk of air contamination by dust, fumes, mist, vapour, gas or other harmful substances, or being trapped within the space could be significant and must be assessed.

When a person is required to enter the body cavity of a compactor, there should be another person in the immediate vicinity and on "stand by", ready and trained to effect a rescue if the person inside the cavity becomes trapped or overcome by an unsafe atmosphere.

Vehicles such as liquid tankers require special precautions and should have safe work procedures developed and implemented before entry into the internal body cavity. This may include sampling the atmosphere in the space prior to entry.

Manufacturers and designers of plant and equipment used for waste collection must, so far as practicable, eliminate the need for a person to enter or work in the body of waste collection plant.

There may be also be work done in work areas such as utility trenches and pits where the ability exit the area is restricted and toxic substances may be present.

The *Occupational Safety & Health Regulations 1996 (WA)* 3.82 to 3.87 and Australian Standard AS 2865 - Safe Working in a Confined Space, include specific requirements relating to working in these workplaces.

### 7.11 Dealing with Aggressive Customers

#### 7.11.1 What is Workplace Violence and Aggression?

Workplace violence and aggression can be an on site hazard that may cause physical and psychological harm and result in permanent disability. Workplace violence includes acts of verbal, physical and psychological intimidation. The experience of aggression is subjective, and may be perceived as violent by one person but not by another. People who witness violent acts can also be affected.
Violence in the workplace can lead to fear, low morale and poor public image, making it difficult to retain and recruit new staff. Costs associated with workplace violence can include cost of absenteeism, lost productivity, equipment damage and higher workers’ compensation premiums. There are also personal costs borne by the employees involved and their families.

7.11.2 Causes of Workplace Violence and Aggression

Violence at work may occur from outside or inside the workplace for different reasons and a combination of factors may be working together. Some examples are:

- criminal activity;
- mental instability;
- influence of alcohol/drugs;
- irritation due to being forced to wait;
- feeling aggrieved and a sense of being treated unfairly;
- build up of anger;
- feelings of loss of control;
- uncomfortable physical conditions;
- cultural, religious or political differences; and
- dissatisfaction with the service of frontline staff.

Those occupations at higher risk for violence include employees who deal with members of the public in service industries and government agencies.

7.11.3 Occupational Safety and Health Legislation

The employer’s General Duty of Care is to provide a safe workplace where employees are not exposed to hazards. This applies to workplace violence and aggression in the same way that it applies to other hazards. If it is both reasonable and possible to protect employees from workplace violence, the employer is expected to take action to reduce the risk of injury and harm.

Employees also have a responsibility under the General Duty of Care provisions to follow work procedures in situations of violence, and use personal protective equipment which is provided. Employees should report all hazards and incidents to the employer and cooperate in implementing activities designed to reduce the risk of workplace violence and aggression.

7.11.4 Managing Workplace Violence and Aggression

7.11.4.1 Identifying the Sources of Violence and Aggression

Identify the hazards, work areas, instances and environments where people are likely to be exposed to violence and aggression.

Risk Management measures should include:

a) performing a workplace audit;

b) reviewing existing accident and incident records and encouraging all employees to report violent incidents;

c) gathering additional information from employees in particular work areas;

d) obtaining information from industry;
e) providing information to employees to increase their awareness of violence as a hazard;
f) assign a person in the organisation to receive enquiries and reports of violence and aggression; and  
g) provide a confidential method of reporting violent incidents for those employees who may need it.

Where appropriate, the workplace should consider implementing a Bullying and Harassment Policy which is widely circulated so that all staff are aware of the standard of behaviour which is expected of them and what the consequences are if they do not meet the standard.

Useful references from WorkSafe WA on the issue include:
- Code of Practice – Violence, Aggression and Bullying at Work
- Guidance Note – Dealing with Bullying in the Workplace – A Guide for Workers

7.11.4.2 Assess the Potential Sources of Violence
Assess the nature and extent of violence throughout the workplace. This applies to obvious and less obvious forms of threat and intimidation. Assessment may be achieved by determining the factors which increase the risk of violence/aggression, determining the urgency of preventative action, and the priority for action to be allocated for each risk. To accomplish this task the following questions should be asked:

a) what is the likelihood of employees recognising the hazard, and understanding the action needed to reduce the risk?
b) how likely is it that someone will be injured or harmed if they are involved in a violent incident?
c) how serious would the harm be if something did happen?
d) how many people would be affected, and how often would these people be exposed to the risk of injury and harm from workplace violence or aggression?

To obtain the above information there is a need to analyse information gathered on violent incidents to assess underlying causes and determine any patterns of violence or threats.

7.11.4.3 Managing and Controlling Potential Sources of Violence
The employer needs to decide how they will prevent or minimise the effects of violence at work. There will often be several solutions. The ideal way to prevent violent incidents is to eliminate the presence of either the (target) worker or the aggressor. When a violent incident occurs in a workplace, ideally, all of the planning should result in a well-coordinated response, with agreed procedures followed in accordance with the training provided.

Procedures which may be adopted include:

a) clear guidelines for staff on dealing with aggressive people and violent incidents, such as how to seek assistance, how to respond to an aggressor’s request, what observations should workers make, and steps to be taken following an incident;
b) systems for alerting co-workers and others;
c) providing personal protection such as duress alarms, mobile phones, radios and self defence techniques;
d) quick access to First Aid and medical assistance, police, emergency service staff and safety professionals;
e) incident reporting procedures;
f) accessing a support service for people involved in violent incidents through an Employee Assistance Program;
g) making changes to the work environment, for example installing security lighting and protective barriers, improving surveillance and visibility, reducing background noise and adding locks to doors and windows;
h) making changes to the system of work to limit opportunities for violence, for example, improving security and communication methods which are particularly important for staff who work alone. In addition to this, there needs to be rostering of sufficiently experienced staff to provide supervision and support to other employees;
i) providing information, instruction, training and supervision to improve the ability of workers to take appropriate action. The training should include information on the responsibilities which employees have under Occupational Safety and Health laws to follow instructions given by the employer regarding their own safety and health and the safety and health of others at work;
j) employees should also be aware of the consequences of failing to follow safety instructions. It is important that workplace violence training is linked to the hazard identification, risk assessment and risk reduction processes. There may be times when employees will have to assess the level of risk in a particular situation and choose the most appropriate response. Supervision should be provided on the job to reinforce the new skills learned in training courses and to ensure each employee continues to put them into practice; and
k) providing a confidential method of reporting violence for workers.

OTHER REFERENCES:
Canadian Centre for Occupational Safety and Health (2005) "Violence in the Workplace" Canada: Canadian Centre for Occupational Safety and Health.

APPENDIX 1: OCCUPATIONAL SAFETY AND HEALTH LEGISLATIVE FRAMEWORK IN WESTERN AUSTRALIA

The *Occupational Safety & Health Act 1984 (WA)* sets objectives to promote and improve Occupational Safety and Health standards. The Act sets out broad duties and is supported by more detailed requirements in the *Occupational Safety & Health Regulations 1996 (WA)*.

The legislation is further supported by guidance material such as approved codes of practice. This legislative framework is depicted below:

<table>
<thead>
<tr>
<th>Major provisions (broad)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Definitions</td>
</tr>
<tr>
<td>- Duties and responsibilities</td>
</tr>
<tr>
<td>- Resolution of Issues</td>
</tr>
<tr>
<td>- Health and Safety Representatives and Committees</td>
</tr>
<tr>
<td>- Enforcement of the Act and Regulations</td>
</tr>
<tr>
<td>- Penalties</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subsidiary provisions (detailed and practical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- set minimum requirements for specific hazards and workplace issues</td>
</tr>
<tr>
<td>- include reference to National Standards developed by Safe Work Australia and some Australian Standards developed by Standards Australia (SAI Global).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting guidance (very detailed and practical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Codes of Practice approved for Western Australia in accordance with Section 57 of the Act</td>
</tr>
<tr>
<td>- Guidance Notes developed by WorkSafe Western Australia Commission</td>
</tr>
<tr>
<td>- National Codes of Practice and National Standards developed by the Safe Work Australia</td>
</tr>
<tr>
<td>- Australian Standards developed by Standards Australia.</td>
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</tbody>
</table>
APPENDIX 2: GENERAL DUTY OF CARE IN WESTERN AUSTRALIAN WORKPLACES

The Occupational Safety & Health Act 1984 (WA) covers all workplaces in Western Australia (other than mine sites, Commonwealth Government sites and some petroleum installations where complementary legislation applies). Similar Acts are in force throughout Australia. The main premise of the Act is based on the following broad duties:

- employers must, so far as is practicable, ensure the health and safety of their employees and others at the workplace. This duty applies to all people in the workplace including visitors, contractors and others;
- manufacturers and suppliers of plant and substances must, so far as is practicable, ensure their products are not a risk to health and safety when properly used at the workplace;
- people in control of workplaces must, so far as practicable, ensure the health and safety of people at the workplace; and
- employees must take reasonable care to ensure their own safety and health and the safety and health of others at the workplace. They must also cooperate with the employer on matters of health and safety.

A2.1 Duties of Employers in Waste Management

Employers should refer to the Code of Practice: General Duty of Care in Western Australian Workplaces.

A2.2 Duties of Manufacturers and Suppliers of Plant

Manufacturers and suppliers of plant must, so far as practicable, ensure:

a) Design and Construction: plant designed and manufactured to be used at a workplace is safe to be used at a workplace.

b) Testing: plant to be used at a workplace has been subject to appropriate testing and examination to ensure it is safe for use at a workplace.

Adequate information must be provided with the item:

a) about any dangers associated with the plant, the results of tests or examinations referred to in its specifications;

b) on proper maintenance of the plant;

c) in relation to safe operation of the plant when the plant is supplied to the workplace, and if requested thereafter; and

d) in relation to the supply of substances, about toxicological data relevant to safe use, handling, processing, storage, transport and disposal.
A2.3 Duties of Employees

Employees have a duty to take reasonable care of their own health and safety and the health and safety of others at the workplace. They must co-operate with their employer on matters relating to health and safety.

In the waste management industry, employees must follow the instructions of their employer to:

a) wear the protective clothing provided by their employer, particularly clothing made of or containing reflective material to ensure they can be readily seen by others when working on roads and other public areas;

b) not wear loose fitting clothing when working with, or in the vicinity of, moving machinery;

c) wear footwear appropriate to the environment in which they are working;

d) not behave recklessly or carelessly;

e) only use vehicles, plant and machinery they are licensed for and authorised by their employer to operate;

f) report any defect in a vehicle or any plant, machinery, equipment or work system to the person nominated by the employer to receive these reports;

g) only ride inside vehicles and on seats provided for this purpose;

h) not enter or place any part of their body in a dangerous vehicle area for any purpose while the motor is running and the hydraulics are engaged;

i) not physically enter the body of a compactor unless isolation procedures are in place;

j) co-operate with his or her employer in the carrying out of the obligations imposed on the employer by the Occupational Safety and Health Act in regard to preventative health measures;

k) avoid adversely affecting the safety or health of any other person through any act or omission at work;

l) ensure plant, machinery and equipment is left in a clean state after use to the extent for which they are responsible;

m) report accidents; and

n) report hazards.
A2.4 Duties of Drivers

In the waste management industry, a Driver is required to:

a) conduct a pre-start safety check as specified by the employer prior to leaving the employer’s premises, and
b) report any defect detected during the pre-start test immediately to the Supervisor or person nominated by the employer to receive such reports.

A Driver must follow their employer’s directions to:

a) comply with any instruction of the Supervisor relevant to any defect reported in a pre-start test. **Note** the Driver can refuse to drive a truck which is in an unsafe condition;
b) observe all road laws and rules set by the relevant authorities for the operation of trucks used for refuse collection, including those relating to driving on the left hand side of the road;
c) drive on the left hand side of the road except in one way streets or where traffic signs indicate otherwise;
d) if required to change a wheel, ensure the wheel cleats are loosened before the nuts are removed and only when the vehicle is jacked, and chocks and safety stands are in place;
e) while on a land fill site, obey all the rules pertaining to that site;
f) ensure that no person stands in the body of the truck while it is moving;
g) ensure domestic garbage bins or recycling receptacles are not placed on the road or on the road shoulder (after emptying) where they may be hit by another vehicle. Commercial bins must be placed as required by the local authority;
h) check to ensure the area is clear of people before tipping the load;
i) use all available steps and hand rails when entering or exiting a vehicle; and
j) be suitably licensed and trained in safe operation of any plant or equipment used in the collection of waste material.

A2.5 Duties of Offsiders Crews

An Offsider must follow their employer’s instructions in relation to occupational safety and health:

a) an employer may authorise an Offsider to operate plant or equipment provided that the employer is satisfied the Offsider has received relevant training and is competent to operate the plant. If authorised to operate the plant, the duties of the Offsider when operating the plant would be the same as those of a person engaged as an operator or Driver;
b) when engaged to assist on a mobile collection vehicle, the Offsider must keep clear of lifters when hydraulics are engaged;
c) never ride on the outside of a truck;
d) do not use hands, sticks, prods, etc to clear any bin when it is being emptied by mechanical means;
e) ensure so far as is practicable, that they are in full view of the Driver;
f) ride in the cab when a vehicle is travelling at more than 20 km/h. Offsiders may ride in a crew carrier when the speed is less than 20km/h;
g) remain seated in the seats provided and wear a seat belt;
h) do not obstruct or otherwise impair their ability to hear the noise of approaching vehicles, signals (such as reversing buzzers, horns, sirens) or verbal instructions or warnings. Personal radios must not be operating when collecting;
i) wear protection from the sun;
j) remove jewellery when working with or near plant, equipment or machinery; and
k) understand how to operate the communication system.

Collection must be from the left hand side of the road, except where there is agreement between the employer, the employees or their representatives and the local authority that it is safe to collect from both sides of the road. In the absence of such an agreement, collection must be as directed by the local authority.

A2.6 Duties Specific to Certain Workplaces

A2.6.1 Material Recovery Facility Centres (MRF)

A person at an MRF must not stand up or operate MRF plant unless that persons has been instructed, trained and authorised by the employer to do so.

a) Employees working at an MRF must at all times follow the employer’s instructions to wear:
   - protective clothing;
   - eye protection;
   - hearing protection;
   - protective footwear; and
   - suitable head protection.

b) Where a risk assessment indicates additional personal protection should be used, an employee may be required to wear or use:
   - head protection;
   - dust masks or respirators; or
   - other personal protective equipment.

c) Employees working as sorters on conveyors should wear gauntlets to protect forearms and feet.
d) The employer should ensure Safety Warning Signs or Safety Notices are displayed to warn employees, and other people who have access to the premises, of any hazards of which the employer is aware. The signs should be easily seen by people working in or visiting the premises. If the MRF operates outside daylight hours, the employer should ensure there is sufficient artificial lighting for the signs to be readily seen and read.

e) The employer should ensure that the appropriate facilities to manage odour and noise pollution to agreed standards are in place.

A2.6.2 Transfer Stations

A person who designs or constructs a Transfer Station should, so far as is practicable, ensure persons who work at, or who are likely to be at, the transfer station are not exposed to hazards. The potential for ground level disposal to eliminate the risk of a fall should be investigated and considered wherever practicable.

See Section 6.2 Transfer Stations for detailed requirements.

A2.6.3 Landfill Tip Faces

The owner or operator of a landfill site should, conduct site inductions and provide adequate supervision at the tip face to ensure:

a) client vehicles are able to move freely about the site without the risk of collision with other client vehicles or site plant;
b) children remain in client vehicles at all times; and
c) adequate separation distances are maintained between pedestrians and heavy vehicles. Note: pedestrians include clients unloading trailers and truck drivers releasing loads or securing tailgates.

Plant operators must follow their employer’s and the site operator’s directions to:

a) conduct a plant check and report;
b) not operate machines unless it is safe to do so;
c) be aware of all nearby hazards and people when reversing;
d) maintain separation of cars and trucks at the tip face;
e) ensure unauthorised people do not ride on machines;
f) wear appropriate foot protection;
g) wear clothing which identifies them as employees of the owner/operator of the site;
h) be conversant with the license conditions of the site;
i) be aware of loads, such as those containing hazardous substances, which are prohibited from being deposited at the site;
j) be in a position to direct the public;
k) direct reversing vehicles clearly (with signs or hand signals) to the tip face;
l) ensure an adequate level of fill is maintained on top of refuse to increase surface stability for tipping vehicles; and
m) prevent loaded vehicles from driving over dumped loose refuse.
Drivers who discharge refuse at landfill depots (tips) must follow their employer’s and the site operator’s directions to:

a) check that adequate space is available behind and above the machine to allow full tailgate opening & body lift movement;
b) advise other persons in the immediate area what impending action is about to take place;
c) ensure the compactor is cycled to clear the hopper prior to opening the tailgate;
d) the tailgate is fully opened prior to ejecting refuse from the body;
e) ensure any vehicles equipped with a body lift system are operated with due care and their stability is checked at all times;
f) the tailgate is closed only after clearing the dumped refuse area to avoid body/tailgate seal damage;
g) ensure that if the vehicle has to be moved with the tailgate or body raised, it is done slowly;
h) ensure refuse is cleared from the tailgate seal and from the rear of the machine before the machine leaves the tip site;
i) ensure the tailgate is positively locked (refer warning lamp indication) after the unloading operation is completed;
j) ensure cleaning the body sump only takes place at a landfill site or in a designated wash bay; and
k) ensure the vehicle leaves the wash down area in a clean condition after use.
APPENDIX 3: SAFETY SIGNAGE

Typical safety signage which can be used to warn people of the dangers associated with waste vehicle operation are found below.

![Safety Signage Images]

- DANGER
  STAND CLEAR of bin and lifter at all times when operating.

- DANGER
  DO NOT STEP

- DANGER
  KEEP CLEAR of unpropped tailgate. Always use tailgate prep.

- DANGER
  WARNING
  Isolate main power before removing inspection panels. Replace panels BEFORE use.

- DANGER
  RELEASE STORED ENERGY from the accumulator system before carrying out any service or maintenance work.

- DANGER
  Ensure winch trunnion latches are CLOSED and securely LOCKED prior to any winching operation.

- DANGER
  OVERHEAD WIRES
APPENDIX 4: INDUSTRY GUIDELINES FOR PLANT AND EQUIPMENT
DESIGN FEATURES OF REFUSE VEHICLES, PLANT
AND EQUIPMENT

A4.1 Generic Design Requirements of Waste Vehicles

GENERAL SPECIFICATIONS FOR ALL VEHICLES

Signage requirements
In terms of the hierarchy for the control of OSH risk in relation to plant, signage and marking is the least effective, and where included, must not be relied on solely to reduce the risk of injury in relation to plant. Signage and marking do, however, provide useful warning for hazards and reminders of safety requirements. The messages conveyed by signs need to be supported by appropriate training and supervision.

Lighting and warning lamps
For Driver awareness, an in-cab indicator lamp that illuminates during the operation of plant is recommended. Rear search lamps to assist reversing, need to be connected to reverse gear or, where this is impracticable, controlled via an in-cab illuminated switch. It is recommended that additional taillights be fitted for rear-loader and side-loader compactor units.

Waste storage
It is recommended that the storage of waste or recyclables outside the body of vehicles not be permitted unless secured in storage compartments designed for such a purpose.

Visibility
Where visibility is restricted, a hazard identification, risk assessment and risk control procedure should be implemented. Assessment of visibility should also include risks to people other than employees, for example pedestrians and other road users.

Crew transport provisions
Crew members must only be transported within the cabin of the vehicle or within specially designed crew carriers. It is further recommended that:

- lighting, including sidelight, be installed if the crew carrier is likely to be used outside of daylight hours;
- crew carriers have seats, seat belts, grab handles, non-slip flooring, roll over protection padding and low floor entry;
- crew carriers only be used while travelling between collection points, and only when the speed of the vehicle is less than 20kph;
- crew carriers not be located on the offside of the vehicle;
- the Driver is able to communicate with Offsiders, preferably by voice by a visual, radio or buzzer system; and
- signage is installed advising Offsiders not to attempt to get into or off the vehicle while it is moving.

The hazards involved with refuse collection machines may be related to their design, operation, maintenance and storage.
A4.2 Design

The following vehicle specifications are designed to eliminate or reduce the risk of injury or harm when operating refuse collection machines or when working in or around refuse collection machines:

a) refuse collection machines must:
   • comply with the Australian Design Rules (ADR); and
   • be operated in accordance with the Road Traffic Act, and the manufacturer's instructions.

b) all cab or chassis modifications must comply with the ADR and the National Code of Practice: Heavy Vehicle Modifications;

c) refuse collection machines must be designed so that legal axle load limits are not exceeded when they are carrying a full load. An overload indicator or inhibitor system should be fitted if safe load limits may be exceeded during typical operational conditions;

d) the cab or chassis should be fitted with an intermittent reversing buzzer. The buzzer noise level may be reduced for night use when headlights are "on";

e) where applicable, rear loader, front loader and side loader compactors should be fitted with a rear view closed-circuit television system and mirrors for unrestricted viewing behind the unit. Television monitors should be positioned to minimise sun glare on the screen and not encroach into the primary viewing area of the front windscreens;

f) headlamps, front position lamps and direction indicator lamps must be positioned to comply with the ADR even when lifting arms are carried in front of the cab during normal driving movement. Duplication of front position and direction indicator lamps is appropriate to allow viewing from all directions;

g) front loader compactor units should have rear mounted flashing beacons or warning lamps which are activated once reverse gear has been selected. Side loader and rear loader compactor units should have front and rear mounted amber flashing beacons or warning lamps. They should be visible in all weather conditions to other road users from a distance of 200 meters from the rear of the machine and should be placed so as to reduce reflection on mirrors and bin lift pick-up areas. For Driver awareness, an in-cab indicator lamp should be illuminated during the operation of lamps. Rear search lamps to assist reversing should be connected to reverse gear, or where this is impracticable, controlled with an in-cab illuminated switch;

h) additional tail lights (stop/tail/indicators) should be fitted for rear loader, front loader and side loader compactor units;

i) rear search lamps (flood lamps) should be installed on vehicles operating outside daylight hours;

j) search lamps (work lamps or flood lamps) should be positioned so as to illuminate the bin lifter operating frame, the lifting frame, the hopper and the rear of the vehicle. These lamps should be controlled with an in-cab illuminated switch;

k) the rear face of the tailgate, the lift arm mechanism, the rear section of the chassis and hook arm should be predominantly white in colour.
l) a First-Aid kit should be kept in the vehicle at all times. (Refer WA Code of Practice: First Aid and Workplace Amenities).

A4.3 Controls

a) the controls should be designed so that they can only be operated from inside the cabin, and they should be located or shielded so as to prevent accidental operation;

b) all controls should be positioned to allow ease of operation by a Driver when seated, be ergonomically designed and readily identifiable in all lighting conditions;

c) all controls must be clearly labelled. Where symbols are used to show the function of a control, the symbols should be a standardised symbol;

d) control levers must be the ‘deadman’ type, that is, all movement must cease when the control lever is released and must not be overridden; and

e) in the case of electronic control, devices should be fitted to stop unintended action caused by electromagnetic interference.

A4.4 Emergency Stops

Emergency stops should be:

- mushroom headed or palm type;
- coloured red;
- lock down, manual reset type;
- clearly marked; and
- capable of stopping all motion immediately the button is depressed and/or during positive isolating or dissipating energy supply (except where this may introduce any additional hazard(s)).

Design Parameters

- all structural parts should be designed with a minimum safety factor of 2.5;
- all hydraulic tubing and hoses should be designed with a minimum safety factor of 4.; and
- cables and wire rope should be designed with a minimum safety factor of 6.

A4.5 Interlocking

Interlocking may be by:

- electrical disconnection by switches which have contacts mechanically separated during the opening of a door and which are difficult to interfere with deliberately;
- electrical disconnection by switches which are a coded key type and virtually tamper proof; and
- disconnection of the control or power system to prevent any movement in the compacting or lifting system.

Where electrical interlocking is specified in these Guidelines, the following should apply:

- door interlock switches should be of the "normally closed" type and mounted to minimise the possibility of failing; and
- interlock switches should have positive action, that is, the contacts should be mechanically pulled apart. In the event of failure of the interlock itself, all movement must cease.
Interlocked guards associated with an interlocking device should operate so that:

- the hazardous machine functions covered by the guard cannot be operated until the guard is closed;
- if the guard is opened while the hazardous machine functions are operating, a stop instruction is given; and
- when the guard is closed the hazardous machine functions covered by the guards can operate, but the closure of the guard must not itself actuate their operation. In some instances guard locking may also be required.

Diagrams showing requirement of Positive Interlock Actions

Not Acceptable - will fall to Danger

Acceptable – Contacts mechanically forced apart
Position switch A operates in the positive mode, with a cam B mounted on the door hinge, profiled to operate quickly as the door is opened. The switch contacts are opened positively by the action of the cam profile and closed by spring action when the door is closed.

**A4.6 Machine Power Unit**

Acceptable – Contacts mechanically forced apart

Not Acceptable - will fail to Danger

  a) power take-off drive shafts should be guarded to prevent accidental entanglement;
  b) regular checks should be carried out to ensure there are no hydraulic oil leaks to cause accidental loss of fluid. A low level hydraulic fluid warning indicator should be fitted to warn the Driver when the hydraulic fluid level is low;
  c) hot surfaces such as engine exhausts, should be guarded or positioned to avoid unintended contact. Where guarding is impracticable, an appropriate warning sign must be displayed; and
  d) all pipes and hoses should be fitted, assembled and retained to avoid:
    - contact with hot surfaces
    - friction; or
    - other unintentional exterior damage.

Visual inspection of hoses and fittings should be possible except where they are located in frames, ductwork or conduits.

**A4.7 Main Hydraulic System Pressure**

The main pressure control should be set at the manufacturer’s specification. The control adjuster should be tamper proof.

Hydraulic accumulators are commonly used in bin lifter systems to automatically lift the bin lifter in the reverse mode. Where a hydraulic accumulator is used, provision should be made to release the stored energy. Appropriate warning notices with words such as the following should be displayed:

```
RELEASE STORED PRESSURE IN ACCUMULATOR BEFORE CARRYING OUT ANY SERVICE OR MAINTENANCE WORK
```
A4.8 Load Hold Valves

Counterbalance, over centre and pilot check valves when used as safety load hold valves, should be:
- fitted directly to the hydraulic cylinder or actuator ports for high risk applications; or
- hard piped using a length as short as possible where it is impractical to mount valves directly to ports. A minimum Safety Factor of 4 should be used for piping in this type of application.

A4.9 Devices to Prevent Equipment Falling

Parts of the container or trailer such as the lifting arm, tailgate, bin winching or tipping system which are operated in any raised position should be controlled by a pilot check valve, counterbalance valve or other control device to ensure all movement ceases in the event of:
- a failure of a hydraulic hose, pipe or fitting;
- a shut down of the hydraulic system by the main or emergency stop controls; or
- activation of body lift controls once the hydraulic system has been shut down. If a hose burst control valve is used within the circuit, a controlled descent is acceptable.

A4.10 Body Lift

Body props permanently attached to the machine should be fitted to mechanically hold the raised body at an angle between 10-15 degrees for servicing. The design should allow for safe supporting of the full body and payload mass:
- a) twin cylinder hydraulic systems should be designed so that they do not introduce any new hazards such as cross transfer of hydraulic fluid;
- b) the maximum tip angle of the body should not be able to exceed 42 degrees; and
- c) the body tip operation should be sequenced or interlocked so that the tailgate has to be opened and the ejector blade extended prior to the body lifting. Override systems may be provided for maintenance or servicing.

A4.11 Body Access

All doors used to access the internal body cavity should be interlocked with the emergency stop system. Where a person is required to enter the body cavity behind the blade, an appropriate access ladder should be provided and other measures taken to prevent falling from the top of the body.

A4.12 Roof Access Ladder

Accessing and working from or on the top of compactors is hazardous and could result in a fall. The objective of Regulations 3.48 to 3.56 of the Occupational Safety and Health Regulations 1996 is to prevent falls from height and practical advice on the means of preventing a fall from height via design include the following where an access ladder is provided:
- a) the ladder must not cause the allowable overall width of the vehicle to be exceeded;
b) the step rungs should be uniformly spaced with sufficient clearance from the sides to allow adequate footing;
c) the step rungs can be used as hand grips, therefore the minimum width of straight section rungs should be 400 mm;
d) a hand grip must be provided on the top surface roof to help workers to pull themselves up and over the edge of the machine;
e) where curved surfaces form the roof of a machine, edge protection should be provided in the form of a perimeter safety rail not less than 100 mm in height and there should be anti-slip strips across the walk areas on the roof; and
f) where there is a fall risk of 2m or more safety rails, barriers or fall arrest systems should be installed.

(Reference - WorkSafe Western Australia Commission Code of Practice for Prevention of Falls at Workplaces).

A4.13 Access and Tailgate Sealing

All access doors and tailgates should have liquid retention seals fitted to prevent the inadvertent loss of pollutant liquids during the transportation of refuse.

A4.14 Hopper Shrouding

Rubber flaps or shrouds should be positioned around the hopper to reduce dust emission and ejection of objects during the bin tipping and compaction cycle. The hopper design should also minimise air turbulence which may cause refuse to blow out onto public road surfaces.

A4.15 Refuse Containment

Open top containers should be fitted with covers which prevent any refuse loss during transportation along public roads.

Tailgate opening or closing:
  a) the design should allow for single person operation;
  b) the closing speed should be controlled by tamper proof flow control valves or other devices to ensure the time for closing is not less than 20 seconds;
  c) hydraulically-operated tailgate locking systems should be positively locked in the closed position by pilot check valves or other control devices;
  d) a tailgate unlocked warning system should be fitted to indicate to the operator, either visually or audibly, that the tailgate is not in the locked position;
  e) tailgate props permanently attached to the machine should be fitted to mechanically hold the door in a position to provide a gap of at least 600 mm for access to the body cavity for maintenance and service activities. The props (including the Safety Factor) should be capable of resisting the hydraulic pressure; and
  f) the control should be totally shielded, or should be a dual action operation requiring simultaneous operation of both devices to prevent accidental movement of the tailgate.
A4.16 Cab Roof Protector

A cab roof protector should be provided on front loading compactors to prevent refuse from falling directly onto the cab roof or between the body to cab cavity. The design should be capable of withstanding a spherical mass of 50 kg falling freely from 1.2 metres without penetrating the protective sheeting.

A4.17 Access to Greasing and Lubrication Points

Remote lubrication facilities should be provided for inaccessible locations, particularly if there is a risk of entrapment.

A4.18 Signage and Markings

Signs should be located at all hazardous locations to advise workers and other persons at the workplace of hazards. Warning signs should be displayed and used in accordance with AS 1319 - Safety Signs for the Occupational Environment. The use of pictograms is preferred, and a combination of words and symbols including wording may be used.

Vehicle Safety Signs

All signage required by Main Roads WA should be fitted with special attention applied to the following:

- Rear Marking Plates complying with AS 4001.1, Motor Vehicles - Rear Marker Plates or ADR Rule 45; Side Reflex Reflectors as required under ADR 13; and
- the sign, black on a yellow reflective background, with a minimum 100 mm high print, displayed on the rear of side loader compactors, with the words:

  CAUTION DUAL CONTROL VEHICLE

The following signs are recommended for use where appropriate, on, in or around plant used in the waste management and recycling industries:

<table>
<thead>
<tr>
<th>Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER</td>
<td>Ensure winch trunnion latches are closed and securely locked prior to any winching</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep Clear of rotating shaft</td>
</tr>
<tr>
<td>DANGER</td>
<td>Before removing any panels ensure electrical isolator switch is in OFF Position. Also remove ON/OFF switch key.</td>
</tr>
<tr>
<td>DANGER</td>
<td>Climbing on vehicles can be dangerous. Carefully plan service or maintenance activities.</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear of unprotected tailgate. Always use Tailgate prop</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear when Hook Frame is raised</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear of Bin and Lifter at all times when operating</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear of Unsupported body. Always use Body prop</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep hands away from Bin Lifter Mechanism</td>
</tr>
<tr>
<td>DANGER</td>
<td>Release stored pressure from the accumulator system before carrying out any service or maintenance work</td>
</tr>
<tr>
<td>DANGER</td>
<td>Stand clear of Tail Gate</td>
</tr>
<tr>
<td>DANGER</td>
<td>Stand clear when compactor panels are moving</td>
</tr>
<tr>
<td>DANGER</td>
<td>Stop Engine and Remove Key before entering body</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear at all times</td>
</tr>
<tr>
<td>DANGER</td>
<td>Keep clear of vehicle when reversing</td>
</tr>
<tr>
<td>DANGER</td>
<td>Do not ride on step</td>
</tr>
</tbody>
</table>
A4.19 Identification Markings on Refuse Collection Machines

A label displaying the company name, product serial number and date of manufacture should be attached to the body structure in a location where it can be readily seen. A decal or label displaying the name of the supplier, the address of the supplier and contact phone number for service reference, should be attached to the body structure in a location where it can be readily seen.

A decal or label should be provided to display the Safe Working Load (SWL) of the lifting system.

A4.20 Bin Markings

A warning decal or label should be fitted to all bins and containers which have been placed in an area close to overhead wires. The decal should be positioned so that it will be illuminated by the headlamps of the truck during night time pick-up. Bins should not be located near overhead wires.

A4.21 Vehicle Specifications

A4.21.1 Front Load Compactor

Vehicle Specifications

- the overall height of the machine must comply with the ADR;
- mirror(s) should be provided so that the Driver can view the lift arm operation above the cab roof line;
- emergency stops should be located at all control stations;
- an in-cab warning lamp should light when the hopper door is partially opened or any part of the lift arms are above the allowable maximum height. The design should incorporate a speed restriction interlock system to prevent vehicle movement, or a restriction system to limit vehicle speed;
- an in-cab TV monitor and rear mounted camera should be installed; and
- rear mounted flashing warning lamps should be fitted in a highly visible location.

Lift Arms

The downward movement of the lift arms should be controlled by a counterbalance valve or other control device to ensure bins can be effectively controlled:

- counterbalance, pilot check, hose burst or other control devices should be fitted in the hydraulic circuit to cease all movement in the event of:
  - failure of hydraulic hosing; or
  - shutdown of hydraulic systems; and
- maximum lifting capacity should be limited by pressure relief valves in the circuit. The relief valve adjuster should be tamper proof or lockable.
A4.21.2 Hooklift Compactors

Vehicle Specifications
a) a work lamp should be provided on the rear of the cab to illuminate the lifting frame. An illuminated in-cab switch should be provided for the work lamps;
b) rear suspension stabilisers should be fitted to units which handle in excess of 8 tonnes, so as to maintain rigidity when loading and unloading containers;
c) steps should be provided to gain access to the top of the hook frame for cleaning and servicing; and
d) the sliding movement of the hook should be controlled by a pilot check valve, counterbalance or other control device so that the container does not creep from its locked position during transportation or tipping.

Lifting Arm
The movement of the lift arm in all positions should be controlled by counterbalance valves or other control devices to ensure the bins can be effectively controlled:
   a) the maximum lifting capacity should be limited by a pressure relief valve in the circuit. The relief valve adjuster should be tamper proof or lockable; and
   b) lifting-arm props permanently attached to the machine should be fitted to mechanically hold the arm mechanism in a raised position for servicing.

Container Anchorage
The container should be securely anchored to the support frame at the front by the hook attachment, and at the rear by mechanical catches or locking pins. Once in the transport position, the container anchorage frame must be hydraulically locked.

A ‘container unlocked’ warning system should be fitted to visually or audibly indicate to the Driver that the container is not in the locked position:
   a) the hook should incorporate a cam lock to ensure positive locking in all lifting arm positions; and
   b) the hook arm and frame should be designed so that they are locked together while tipping to prevent articulation if the bin locks become disengaged.

A4.21.3 Rear Load Compactors
Vehicle Specifications

a) all controls should be located or shielded to prevent accidental operation;
b) the bin-lift control should be of the 'deadman' type and must not be overridden;
c) the maximum lifting capacity should be limited by a pressure relief valve in the lift circuit. The relief adjuster valve should be tamper proof;
d) the speed of the lifter should be controlled hydraulically by tamper proof flow controls or other devices to limit the speed to a maximum of 10% above the designed operating cycle time;
e) all controls should be located so that the operator is safely outside the range of movement of the bin and bin-lifting device and is still able to have a full view of the binlifter area. If this is not practicable, shielding or barriers should be considered;
f) the binlifter system should become inoperable as soon as the vehicle is placed into the drive mode;
g) the binlifter design should prevent the release of the bin in the tipped position. An in-cab warning system should operate to advise the Driver if the binlifter is in a position that puts it at risk of damage and to minimise possible binlifter mechanical damage during vehicle reversing;
h) binlifters which are carried in a partially raised position during normal travelling mode should be fitted with a mechanical restraining device. This device can be automatically or manually engaged to prevent hydraulic creep while travelling extended distances;
i) some binlifters are equipped with automatic lift systems to raise the lifting frame to a suitable safe position for reversing. During this lift operation there should be limited movement, slow speed, no shear or trapping points, and there should be a warning system to advise the Driver and the Offsider that the lifter is in motion;
j) the binlifter should be predominantly white or in some other highly visible colour;
k) additional upper tail lights (stop/tail/indicator) should be fitted;
l) an in-cab TV monitor and rear mounted camera should be installed; and
m) front and rear mounted flashing warning lamps should be fitted in a highly visible location.

Compactor Controls

The compactor mechanism must be incapable of operation during the truck starting mode.

A manual selector should be provided to change from the starting to the compaction mode:

a) controls should be located or shielded to prevent accidental operation and be in a position where the operator has a clear view of the compaction area. It is acceptable to have front body mounted controls to allow cycling of compactor panels while the tailgate is in the opened position to clear refuse, but the system should not be able to function in the tailgate-closed position;
b) the start function should have to be re-activated after operating an emergency stop button or opening an interlocked access door;
c) open back units, which operate automatically after activation of the controls, should only do a half cycle without further control activation;
d) the compactor panel which sweeps the hopper bowl clean should be capable of reverse operation at any stage in the cycle, either by manual or pushbutton electrical controls;
a) the speed of the compactor panels should be controlled hydraulically by tamper proof flow controls or other devices to limit the speed to a maximum of 10% above the designed operating cycle time;

b) any outside control stations mounted forward of the tailgate should only be mounted on the left hand side of the machine; and

c) emergency stops must be located at all control stations which, when depressed, will immediately cease all compactor operation. Emergency stops should be located on each side of the tailgate.

**Crew Carrier**

Offsiders must ride in the cab of the vehicle or a purpose-built crew carrier inside the envelope of the vehicle and only be able to get off the vehicle on the kerbside when the vehicle is stationary:

a) crew carriers should only be used while travelling between collection points and only when the speed of the vehicle is less than 20km/h;
b) the Driver must be able to communicate with the Offsiders by a visual, radio or buzzer system;
c) a crew carrier should have seats, seat belts, grab handles and non-slip flooring; and
d) lighting, including side lighting, should be installed if the crew carrier is likely to be used outside of daylight hours.

**Driver/Offsider Communication System**

A communication system activated by the Offsider from either side of the tailgate should be provided so the Driver can be signalled when it is safe for the machine to be driven forward to the next pick-up zone:

a) a rear warning horn or buzzer system activated by the Driver from within the cab should be available to alert Offsiders of any dangerous conditions and when the truck is about to be reversed;
b) where buzzers are not practicable, other equally effective communication systems should be employed, such as two-way radio or camera system; and
c) a communication system is required for communication between the Driver in the cab and an Offsider in a crew carrier.

**Bin Winching Safety Requirements**

Some rear loader compactors are fitted with winches or reeving cylinders to winch bins of various sizes (1 to 6 cubic metres) into the tailgate hoppers. The front of the bins are usually fitted with a pivot bar while the rear section has an anchor point where the winching cable is connected:

a) drums/sheaves and cable should comply with the requirements of AS 1418 Cranes (including hoists and winches);
b) cable anchorage should be secured at two points as per AS 1418;
c) the maximum lifting capacity should be limited by a pressure relief valve. The relief valve adjuster should be tamper proof; and
d) the bin pivot bar should be retained in trunnions with the catches requiring a two-step operation to be released.
A4.21.4 Side Loader Compactor

**Vehicle Specifications**
- a) sideloader compactor units when mounted to a conventional cab/chassis should be dual controlled;
- b) all dual-control cabins should include remote driving mirror controls or swivel TV monitor to allow simple adjustment from either driving seat;
- c) an in-cab TV monitor with a rear mounted camera should be installed. Consideration could be given to additional cameras mounted in the hopper;
- d) front and rear mounted flashing warning lamps should be fitted in a highly visible location; and
- e) search lamps (work lamps/flood lamps) should be positioned to illuminate the bin lifter, hopper and rear of vehicle. These lamps should be controlled by an independent in-cab illuminated switch.

**Controls**
The compactor mechanism should not be able to operate during the truck starting mode. A manual selector should be provided to change from the starting to the compaction mode:
- a) a system to isolate the bin collecting control function from the body/tailgate function should be fitted to prevent accidental operation. Alternatively, a dual action operation requiring simultaneous engagement or shielded controls may be used; and
- b) emergency stops which, when depressed, will immediately cease all sideloader compactor operation should be located at all control stations and within the hopper service area.

**Hopper Access**
Access to the hopper area for maintenance and service activities should be made as safe as practicable:
- a) an access ladder that complies, as far as is practicable, with Australian Standards AS 3868 Earth Moving Machinery - Design Guide for Access Systems and AS 1657 Fixed Platforms, Walkways, Stairways and Ladders - Design, Construction and Installation should be installed. The design should include non-slip foot surfaces and be of a fold out design which incorporates a safety switch linked to the emergency stop circuit. Hand holds should also be provided and the lowest step should be situated as near as practicable to a minimum height of 600 mm above the ground level;
- b) all driving components of the packer mechanism must be guarded and only service personnel allowed access to the area;
c) a key operated switch or similar may be fitted to the hopper area to allow competent persons to operate the packing mechanism for testing and adjustment. An emergency stop button should be readily available within this service area; and
d) installing a closed circuit television system to view the hopper area would minimise the number of times the machine operator may have to climb on the machine to inspect the area for refuse blockages.

Body lift
Bodies with twin lift cylinders should be fitted with stabilising flow devices so as to lift the body uniformly under unstable tip site conditions:
   a) a "body up" warning system should be installed to indicate to the operator, visually or audibly, that the body has left the down position; and
   b) the opening and closing speed should be controlled by tamper proof flow control valves or other devices so as to limit the time from closed to open or from open to closed to not less than 20 seconds.

Binlifter location - Binlifter Safety Requirements
Binlifting mechanisms should only be mounted on the left-hand side of the machine, and in the retracted position should be within 1250 mm from the centreline of the vehicle. The Driver/operator should have an unrestricted view of the binlifter and pick up area by:
   • direct viewing through the cab windows;
   • work mirrors mounted to the cab door; or
   • a closed circuit television system.

Binlifter Controls
Internal controls should be of the 'deadman' type and be conveniently positioned and adjustable to suit the operator when sitting in the varying slide seat positions.

The controls must not be overridden:
   a) external controls should be of the 'deadman' type and the operator should not be within 1500 mm of the binlifter when working them. A two hand operation, comprising of a 'deadman' handle and a pushbutton (or similar) should be used to ensure that the operator is clear of the slide and/or binlifter area during operation. The controls must not be overridden; and
   b) for combination internal/external controls, a tamper proof selector switch to isolate the cab from external control operations must be included within the control system. The joystick control area (when applicable), should be well clear of other controls and/or be shielded to minimise the risk of accidental activation.

Binlifter Operation
The binlifter should not be allowed to be operated while the vehicle is in motion unless an auto park system is included in the design:
   a) the 'auto park' system should only become active when the truck's forward motion is between 1 to 5 kph. The forward speed should be limited to a max of 5 kph until such time as the binlifter/slide is fully parked in the stowed position. The binlifter control should become inactive as soon as the truck's forward speed exceeds 8 kph;
   a) a visual or audible dash mounted warning should operate when the binlifter has been extended past 1250 mm from the centre line of the vehicle to indicate an 'over width' situation;
b) binlifter mechanisms which grab the bin with a clamping action should not exert excessive pressure in the closed position in case a person is inadvertently trapped. Binlifter mechanisms which grab the bin with suction cups should also be held by fingers under the bin lip so that the bin cannot separate from the lifting mechanism at any time during the movement cycle, even if loss of suction occurs;

c) the speed of the lifter should be controlled hydraulically with tamper proof flow controls or other devices to limit the speed to a maximum of 10% below the designed operating cycle time, irrespective of PTO speed; and

d) maximum lifting capacity should be limited by a pressure relief valve in the lift circuit. The relief valve adjuster must be tamper proof or lockable.

A4.22 Stationary and Small Portable Compactors - Basic Stationary Compactor Configuration

Stationary compactor with detachable bin

This type of machine consists of a compaction unit installed in a fixed location with a detachable container. The size of the container can vary from a 1.5 cubic metre front-loader type to a large 45 cubic metre type. This type of unit can be hand or chute fed, and can be fitted with different types of bin-lifting devices.

Transportable Unit

This is a transportable-type machine with integrated compactor and container where the complete machine is removed for emptying. This type of unit can be hand or chute fed, and can be fitted with different types of bin-lifting devices.
Small on-site balers and compactors used to compact wastes before collection may include vertical and horizontal configurations used, for example, as a bin compactor or baling press.

**Compactor Specifications**

a) all controls should be located or shielded so as to prevent accidental operation;
b) an Emergency STOP button must be located at each control station;
c) the bin-lift control should be of the ‘deadman’ type and must not be overridden;
d) the maximum lifting capacity should be limited by a pressure relief valve in the lift circuit. The relief valve adjuster should be tamper proof or lockable;
e) the speed of the lifter should be controlled hydraulically with tamper proof flow controls or other devices to limit the speed to a maximum of 10% above the designed operating cycle time;
f) access doors should be fitted with an interlocking system so that the ram does not operate with the door open. This does not include the main container door;
g) service panels should be secured by a device removable only by using hand tools. Panels which are frequently removed should be interlocked;
h) the main pressure control should be set according to the manufacturer’s instructions or maintenance manual;
i) walkways around and on platforms above stationary compactors should conform to Australian Standard AS1657: Fixed Platforms, Walkways, Stairways and Ladders - Design, Construction and Installation; and
j) safety bars should be installed to guide rails when applicable (i.e. Dinosaur system) to prevent the container running away and damaging the packer unit.

**Controls**
The main control panel should be positioned so that the operator is able to observe there are no persons in any danger zones, and where practicable, any secondary controls should achieve the same result:

a) all controls should be located or shielded so as to prevent accidental operation;
b) electrical control panel access doors should be fitted with a key lock facility;
c) the main on/off control switch should be key operated and should be designed to prevent the key from being removed when in the 'ON' position. Small or portable type compactors may be excluded from this requirement, particularly where there is no public contact. A Green Push Button ‘START’ and a Red ‘STOP’ must be provided;
d) the machine should be fitted with a mains power key-lockable isolating switch which should only allow the key to be removed in the ‘OFF’ position. This may not be appropriate for small or portable type compactors which may be provided with a plug in type electrical lead for a primary power source; and
e) an Emergency ‘STOP’ must be fitted to the main control.

Hopper Opening
The hopper design should prevent access to any trapping point caused by the ram movement from the loading position:
   a) the lower edge of the hopper loading area should be a minimum of 1.2 metres above the operator's working surface;
   b) when the hopper design allows the operator to be in a position to reach trapping points caused by ram movement, an enclosed hopper with a lockable interlocked door should be fitted; and
   c) if it is possible for the general public to have access to the hopper opening, a fully enclosed hopper with a lockable interlocked door should be fitted.

Compactor Ram Operation
Where practicable, the ram should stop in the forward position at the completion of the cycle:
   a) the start function should need to be re-activated after operating an Emergency Stop button or opening an interlocked door or access panel;
   b) the compactor ram should immediately retract on operation of the start control so that it comes out of the compact cycle; and
   c) after closing the access doors and before starting the equipment, the operator should conduct a visual inspection to ensure no service personnel are working on the unit.

Containers
Containers used to transport wet waste should have liquid retention seals at access and main doors to prevent the inadvertent loss of pollutant liquids:
   a) main door locking systems should be of a robust construction with a minimum Safety Factor of 4 used as the design criterion. Stored energy in a compacted load is always present. The design should aim to minimise any abrupt kickback forces as the mechanism is released. A chain should be fitted to provide a safety link between the container body and door;
   b) the main door of the container should be securely restrained to the side during the unloading operation to prevent accidental closure;
   c) all manually operated doors should be mechanically restrained when opened to prevent high winds from accidentally moving them during the unloading operation;
   d) containers which have compactor ram openings should have covers fitted to restrict refuse loss during transportation;
   e) containers which have an end opening where the ram penetrates for compacting purposes, should be fitted with covers to eliminate spillage during transportation; and
   f) compactors with a container lock-off system should be fitted with interlocked doors over the lock-off tube access holes. All container lock-off systems should be designed so they can only be accessed from the outside of the machine.
A4.22.1 Binlifter Safety Requirements

Mechanical binlifters provide an efficient method of lifting and emptying refuse bins, however, this can cause injuries to operators and other persons if the operation is not done competently and with appropriate mechanical equipment. The extent to which the risk of injury can be reduced or eliminated depends on the type of lifting device used and the bin sizes they pick up.

The following requirements apply to Comb-Type Lifters used to pick up 50-240 litre plastic bins and having a maximum lift capacity of only 100 kg and Comb, Bottom or Side-Type Lifters used to pick up bins (plastic or steel) up to 3 cubic metres and having a lift capacity greater than 100 kg:

a) all controls are located so that the operator is safely outside the range of movement of the bin and bin lifting device and has a full view of the binlifter area;

b) where the controls are located within the movement range of the binlifter, separation guarding fitted between the binlifter and the controls. The guard should be of a type that gives the operator a clear view of the bin-lift area as well as preventing access to mechanical trapping points; and

c) single-acting cylinder type binlifters should descend slowly at a controlled rate not exceeding 60 mm/sec in the event of hydraulic system shut down with the bin-lift control still being activated.

The below requirements are supplementary to general safety requirements and vary due to the location of the machines.

Where the machines are located within secured (lockable) designated areas and are not accessible to the general public:

a) the controls should be located so that the operator is safely outside the range of movement of the bin and bin-lifting device and the operator has a full view of the binlifter area; and

b) a barrier or enclosure should be provided to prevent people from walking into the path of the bin and binlifter movement zone. The barrier or enclosure should be at least 1.2 metres higher than the working surface.

Where machines are located in areas to which the general public has ready access:

a) all controls should be located so that the operator is safely outside an enclosure which surrounds the binlifter operating area;

b) in the case of a stationary compactor, the binlifter and hopper area should be fully enclosed by guarding which is fitted with a lockable interlock door;

c) the guarding should be of a type which gives the operator a clear view of the binlifter area, as well as preventing access to any mechanical trapping points;

d) in the case of a transportable compactor, the enclosure may be a mobile type or have hinged sections to allow practical removal and replacement of the unit when being moved; and

e) the door interlock connection should disable the compactor and binlifter operating function when unplugged.
A4.22.2 Safe Work Practices for Stationary Compactors

a) persons in control of, or operating, stationary compactors should be trained to carry out these tasks;
b) walkways should be kept clean and dry at all times, particularly where the public has access;
c) binlifters should be left in the lowered position when not in use; and
d) maintenance, servicing and testing of the plant should be carried out by a competent person on a regular basis in accordance with the requirements of the manufacturer.

Special care should be exercised while unloading a container on to the guide rails and reconnecting it to the packer unit, e.g. ensure all persons are clear of the unloading area. Reverse the container onto the packer unit slowly to avoid damaging the anchorage points and to reduce noise levels.

A4.22.3 Tipping trailers

Tipping trailers are items of plant designed to carry non-compacted refuse in open-top or compaction type containers which are integrated with special tipping frames mounted to cab/chassis and trailer combinations.

They can be broadly classified in two basic groups:
- tip-over-axle type;
- rigid type tipper trailer commonly referred to as sub frame or chassis trailers combined with bogie, pig or dog trailer.

Vehicle Specifications

The manufacture of cab/chassis and trailers is controlled by ADR which covers most safety aspects of their design. All air couplings should be routed so as not to foul the trailer in the normal operating or tipping positions.

Controls

a) where it is not practicable to mount controls in the truck cabin, the controls should be located so that the operator can operate the truck with a clear, unobstructed view of the tipping trailer; and
b) control levers (excluding some power take off drives), should be the 'deadman' type which causes all movement to cease when released. The control should not be overridden.
Tipping System
Where practicable, the design (except for tip-over axles) should:
   a) have body props fitted to mechanically hold the body raised for servicing; and
   b) allow for safely supporting the body fully loaded. Only where the design makes it impracticable to have body props should externally provided body props be used (and only in accordance with a documented system of work).

The maximum tip angle of a container/trailer during tipping should be kept as shallow as practicable in an effort to maintain the lowest centre of gravity of the tray/payload.
A4.23 Plant Manuals

Designers have a responsibility to assess and control the risks associated with the plant they design, and to provide safety information about the plant to manufacturers and suppliers. This information should be passed on to suppliers and persons who purchase the plant, (usually owners or employers), in the form of technical or operating manuals:

a) an Operating and Maintenance Manual should be supplied with the machine and be readily available to Drivers and plant operators;

b) the Manual should be written in English, provide adequate information to enable the machine to be operated safely, and give clear, unambiguous instructions concerning its maintenance;

c) the Manual should contain a specific section, or make reference throughout, to safety measures, highlighting the risk and measures of control to reduce risks associated with the machine. Attention should also be given to the risks which could exist when handling fluids or substances in the maintenance of the machine;

d) the Manual should provide guidance for safe working according to the conditions of the work environment, such as where low overhead electrical lines are present, or surfaces are unstable;

e) appropriate and readily understood pictograms should be used to supplement the text;

f) a Service Manual should be provided which gives adequate information to enable suitably trained personnel to service and test the machinery with a minimum of risk. A single Manual may be prepared to cover operation, maintenance and service; and

g) a spare parts catalogue containing all safety-related spare parts items should be provided by the supplier.
APPENDIX 5: SOURCES OF FURTHER INFORMATION

Australian Occupational Health Legislation
Occupational Safety and Health Act, 1984
Road Traffic Act 1974
Occupational Safety and Health Regulations, 1996
Health (Asbestos) Regulations 1992

Australian Standards (AS) /Australian New Zealand Standards (ASINZS)
AS 1319 -1994: Safety signs for the occupational environment
AS 1418.1 -1994: Cranes (including hoists and winches) - General requirements
AS 1418.2 -1997: Cranes (including hoists and winches) - Serial Hoists and Winches
AS/NZS 1715 -1994: Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 -1994: Respiratory Protective Devices
AS/NZS 1800 -1998: Occupational Protective Helmets - Selection, Care and Use
AS 1851.14995 - Maintenance of Fire Protection Equipment - Portable Fire Extinguishers and Fire Blankets
AS/NZS 2161.2 -1998: Occupational Protective Gloves - General requirements
AS 2865-1995 - Safe Working in a Confined Space
AS 4001.2-1992 - Motor Vehicles - Rear Marker Plates - Fitting Requirements
AS 4024.1-1996 - Safeguarding of Machinery - General Principles, Federal Office of Road Safety
Australian Design Rules for Motor Vehicles and Trailers, 3rd Ed. Canberra, 1986
WorkCover NSW

Safe Work Australia Council publications (formerly Australian Safety & Compensation Council and National Occupational Health and Safety Commission)

Codes of Practice published by WorkSafe Western Australia Commission
Including First Aid, Workplace Amenities and Personal Protective Equipment; Manual Handling Management of HIV/AIDS, Hepatitis B and Hepatitis C at Workplaces; Prevention of Falls at Workplaces; Managing Noise at Workplaces; Working Hours.

Guidance Notes published by WorkSafe Western Australia Commission
These include: The General Duty of Care in West Australian Workplaces; Alcohol and Other Drugs at the Workplace; Isolation of Plant; Powered Mobile Plant; Provision of Information on Hazardous Substances at Workplaces; Reducing the Risk of Fatigue at Workplaces; Working Alone
The Code of Practice has been developed to ensure that clinical and related wastes are segregated, containerised, transported, treated and disposed of in a manner that promotes “best practice”. This would ensure that there would not only be environmental benefits, but also ensuring the wastes are managed in a safe and cost-effective manner.

Health and Safety Guidelines for Waste and Resource Recovery Educators in Victoria (March 2009)
These guidelines have been prepared for Waste and Resource Educators to assist in their evaluation of various sites as to the application of health and safety issues. These guidelines for Waste and Resource Recovery Educators relate to their conducting tours to waste and recycling related facilities, transfer stations, landfill and other sites. These guidelines have also been devised as a tool for Waste and Recovery Educators when planning their own work programs, including the conduct of workshops and educative programs, and conducting waste audits and/or assessments.

Asbestos Management Guidelines for Construction & Demolition Waste Recycling Facilities
This Asbestos Management Guideline has been developed to assist C&D Waste Recyclers and Processors in managing asbestos within their operations and reduce the risk to themselves, their employees and users of their sites and products being exposed to asbestos fibres

Other Publications:

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