1. **Materials Recovery Facility**

A materials recovery facility (MRF) is a specialised plant that can use mechanical or manual sorting processes (or a combination) to separate and prepare bulk recyclable materials for on sale. Recyclables are generally collected as part of a kerbside collection service and may include glass bottles, steel or aluminium cans, paper and cardboard, and plastic containers. MRF facilities are generally privately owned and operated.

Operators should have a clear understanding of the materials coming into their facilities for processing. This includes the type of material, the volume and delivery times as well as levels of potential contamination and required output.

**IMPORTANT:** Separate modules have been developed for Resource Recovery Parks, Materials Recovery Facilities and Refuse Transfer Stations. Operators should familiarise themselves with these guidelines to ensure they are applying the details of the correct guidelines to their specific facility. If you have a pit on site, please refer to the Refuse Transfer Station module.

**Design & Operations**

The primary aim of Safety in Design is to identify and manage risks. Safety in Design is a process that integrates hazard identification and risk assessment methods early in the design process, to eliminate, isolate or minimise the risks of injury to those who will construct, operate, maintain, decommission and demolish the asset.

---

The opportunity to eliminate a hazard in the early design stages by involving decision makers and considering the life cycle of the project is invaluable.

**THE LAW:** Operators of MRFs must ensure they are aware of and comply with relevant legislation, Standards and Guidelines. This includes but is not limited to:

- HSNO Act 1996.

**MORE INFORMATION:** Further information on legislation can be found in section 3 and Appendix 8.

**PROSECUTIONS:**

An employee lost his arm whilst operating a baling machine which baled plastic and metal for recycling. After noticing an item of a different grade of plastic, the worker attempted to retrieve it from the baling machine but caught his sleeve, leading to his arm being crushed as the baler operated. The company was fined $40,000 and ordered to pay reparation of $50,000.

A forklift operator was fatally injured after being crushed by bales of paper, each weighing more than half a tonne. An investigation by the Department of Labour found that the company’s stacking procedures for recycled paper were at fault. The company did not have a code of practice for stacking, despite employee concerns about the height of stacks. The stack that fell was leaning dangerously and at seven bales high, was higher than Department of Labour guidelines allow. The employee was found face down, two and a half metres from the forklift he had been using. The machine was in reverse gear with its engine still switched on. It was unclear what the employee had been doing at the time of the accident. However, the Department of Labour concluded that the employee might have survived if he had followed basic safety procedures and stayed inside the protective cage of his machine.

The company was fined $35,000 and ordered to pay reparations of $40,000 to the family, in addition to $20,000 the company has already tendered. It has since introduced detailed safe stacking guidelines.
Activities involved with Materials Recovery Facilities

- Site access is usually via a weighbridge.
- Recyclable materials are dropped off by a variety of collection trucks, or bulk delivery.
- Materials are generally delivered to a single point and transferred to a conveyor system in preparation for sorting.
- Materials are sorted using a combination of conveyors which feed into baling machines or stockpiles. One method of separating items is by personnel removing materials as they travel along a conveyor system; other methods include combinations of automated separation including optical, magnetic, eddy current, and air assisted automated separation technology.
- Once materials are sorted and where applicable, baled, they are likely to be stored on site to await transport off site. In the case of bulk re-usable materials, goods may be moved around the site to meet storage needs of the facility.
Hazards

There are a wide range of hazards associated with the operation of MRFs that include but are not limited to:

- Stationary and mobile plant and equipment, which may include balers, conveyors, compactors, forklifts, excavators, tractors or loaders and trucks.
- Processing materials through a MRF creates various hazards such as a dusty working environment from paper, cardboard and glass and sharp edges arising from steel can lids, broken glass and plastic.
- A MRF may receive a range of contaminated and non-recyclable materials which includes; hazardous substances, dangerous goods, sharps, animal and medical/veterinary waste and general refuse.
- Poor ergonomics considering conveyor heights and width, conveyor speed, sorting station setup and workflow.
- Environmental health hazards such as noise, fumes, exhaust, dust, and lighting.
- Site traffic management including delivery, site vehicle movements, material load-out and reversing vehicles.
- Pedestrian and vehicle interaction created by site traffic, including the risks of customer and operator delivery, material load-out and reversing vehicles.
- Manual handling such as repetitive sorting, lifting, twisting movements while sorting.
- Stacking and storage requirements for bales, or pallets (maximum height) stability.
• Fire as the result of combustible materials including clothing, paper and cardboard, plastics, ashes.
• Poor housekeeping including lack of cleanliness, spillage of materials off conveyors, residual detritus, slippery surfaces, poor organisation of materials, clutter.
• Unprotected edges such as stairways, pits or raised tipping platforms and negotiating obstacles and terrain. Walking through and around stockpiles and baled material, uneven surfaces, pits or tunnels may create a significant slip, trip or fall risk.
• Actions or behaviours of visitors including customers, contractors, commercial operators, tour groups and children.
• Pests including birds, cats, wasps and rodents.
• Magnets and eddy current have a very high magnetic current that can have a harmful effect on pacemakers.
• Conveyor speeds greater than 10 metres per minute can lead to motion sickness-like symptoms in operators working perpendicular to the belt.²
• Unprotected edges when cleaning, modifying and maintaining plant and equipment.
• Working in confined or restricted spaces.
• Use of compressed air and high pressure water.

**ACTION POINT:** All hazards must be identified, assessed and recorded. Employees should be reminded regularly of all relevant hazards and the controls in place.

**Recommended Good Practice Controls**

**ACTION POINT:** Implementing or addressing the following measures will help employers meet legal and good practice requirements:

² Ergonomic Considerations for Designing and Selecting Conveyor Belt Systems (HSE. GOV.UK)
**Plant & Equipment**

- Stationary and mobile plant and equipment should be used for the purposes for which it was designed and users must be licensed, trained and authorised to operate specific plant; all equipment should be maintained in accordance with manufacturer’s recommendations. Operating procedures should describe the safe and correct use of the plant or equipment.
- Guarding, interlocking systems, Lock Out and Tag Out procedures, warning beacons and sirens should all be considered as appropriate hazard controls for plant and machinery at a MRF, e.g. conveyors and baling machines.
- Permit system for repairs and maintenance e.g. hot work, confined/restricted spaces.
- Methods for protecting workers while working at heights which may include scaffolding/handrails work positioning systems, fall restraint or arrest systems.
- Training and Personal Protective Equipment (PPE) for staff using compressed air should be provided.
- Signage and information, pre-employment health assessments, induction and training is to be provided to ensure all persons on site are aware of the existence of magnetic, eddy current and optical sorting plant that could adversely affect health or medical conditions.

**Manual Handling**

- Workers who are required to handle materials and/or waste should have appropriate vaccinations to protect against the risk of infection. Appropriate PPE must be provided to minimise the risk of exposure to noise, dust, sharps, medical waste and other identified hazards.
- Adherence to correct manual handling practices is essential in minimising the risks to operators. Repetitive movements, lifting or moving items, twisting movements, and overreaching should be managed through the implementation of suitable controls. These
might include the use of mechanical lifting devices, sorting station setup, manual handling training and PPE.

- Sorting stations, conveyors and benches should be designed and organised to ensure they allow enough space to perform the tasks and should also be of a suitable height and width for each worker.
- Activities should be reviewed in terms of their impact on each other to ensure workflow does not create additional hazards. Workflow and sort area setup should also be considered. Conveyor speed should be managed to reduce potential harm due to repetition and motion sickness.

**MORE INFORMATION:** Refer to Section 16 of these Guidelines for more information on manual handling.

**Housekeeping and Site Management**

- A suitable site traffic management plan should be developed to ensure the safe passage of vehicles and pedestrians around the site. This should address hazards associated with **ALL** vehicle movements on site, including mobile plant. Operators should consider the use of a spotter or points-person for reversing vehicles, or vehicles raising their hoists. Management of speed, traffic flow and pedestrian movements should all be considered. Clear separation of mobile plant and pedestrians should be designed into the site layout.
- Items that are stacked or stored should follow an appropriate storage plan which includes details on maximum bale heights and stability of stored items and stockpiles.
- MRF operators should ensure housekeeping practices are implemented to maintain a safe workplace. This includes keeping walkways and access ways clear, safe storage of materials to avoid stockpiles spilling out of storage bays, cleaning up spills immediately after they occur and keeping emergency exits and emergency equipment clear of stored
items and debris. Care should be taken to avoid the accumulation of potentially flammable dusts generated by the handling and processing of paper and cardboard.

- Appropriate PPE must be provided to minimise the risk of exposure to noise, fumes, dust, sharps, irritants, medical waste and other identified hazards.
- Site security and fencing should be in place to prevent unauthorised access and scavenging. There should be clear rules around scavenging of materials to prevent harm to site visitors and staff.
- Pest eradication plans and systems should be in place.

**Visitors to site**

- MRFs should have contractor management systems in place including induction, hazard identification, accident reporting, contractor monitoring and emergency evacuation.
- Visitors should be accompanied at all times.
- Commercial operators should be directed and monitored to ensure safe behaviour and assisted where necessary.
- Specific plans should be developed to manage tour groups.

**Materials Acceptance**

- MRFs should have procedures for the identification, handling and disposal of non-complying materials. Clear guidance and training should be provided to site workers on identification and handling of materials outside of the scope of their material acceptance criteria.
- Systems to identify and control combustible materials for example paper, cardboard and plastic should be implemented. This might include training of staff, the provision of fire prevention and fire fighting equipment and emergency plans.
- Materials should not be stacked outside against the wall of the building.
- Monitored alarm system and internal sprinkler systems should also be considered.
• Personal Protective Equipment must be issued where hazards have been unable to be eliminated or isolated. Employees must be required to use the equipment and employers must provide training in the use of any PPE supplied.

MORE INFORMATION: Refer to Section 18 of these Guidelines for more information on Personal Protective Equipment.

Lock Out procedures for vehicles and equipment used at Materials Recovery Facilities

• Lock Out instructions for each piece of equipment and vehicle must be provided to enable activities to be conducted safely and power to moving parts must always be locked out.
• Ensure requirements around Lock Out procedures form part of Induction training for new employees to the place of work.

Situations requiring Lock Out may include:

• Repairing any mechanical malfunctions or breakdowns affecting the safe operation of plant or equipment.
• Regular maintenance and inspections of all pieces of plant, equipment and vehicles.
• Specific inspection and testing of all safety interlocks, switches and other protective devices to ensure that devices have not been disabled or bypassed.

IMPORTANT: If safety devices are bypassed or damaged, the piece of equipment or vehicle should not be used until they are fully functional.
MORE INFORMATION: Further information on Lock Out Tag Out procedures can be found in section 15 of these Guidelines.

**Cleaning, maintenance, modifications and repair**

- Before any cleaning maintenance, modification or repair of plant or equipment is undertaken, full Lock Out procedures should be used.
- Maintenance should be undertaken at frequent and scheduled times.
- Operating instructions should be available setting out the use, cleaning and care of the unit or components, including after modifications have been made.
- Modifications should only be carried out by trained and competent personnel.
- Operating instructions should include precautionary notices associated with the reconstruction or modification.
- Hazard assessments must be conducted and recorded relating to any modifications.
- Methods for protecting workers while working at heights which may include, scaffolding/handrails work positioning systems, fall restraint or arrest systems.

IMPORTANT: Modifications may include change in plant, equipment, materials process or tasks.
Training


Examples of methods to ensure that employees receive appropriate training include:

- Provision of clear, concise and safe Standard Operating Procedures (SOPs) including vehicle checklists and corrective action follow up.
- Induction and regular in house training courses and refresher sessions.
- Specific health and safety training, e.g. driver training, Lock Out Tag Out (LOTO) and manual handling.
- Toolbox meetings discussing safe and correct operational practices.

Retention of appropriate training records, along with details of training providers and any refresher requirements, is strongly recommended.

MORE INFORMATION: To assist you with this process, Appendix [number] sets out examples of generic hazards associated with all waste collection and processing methods along with recommended control measures. The following table also sets out additional hazards associated with Materials Recovery Facilities.
Table [number]: Additional hazards for Material Recovery Facilities

This hazard register should be read in conjunction with ‘Appendix 7: Generic hazards associated with all waste collection and processing methods’

<table>
<thead>
<tr>
<th>Work Activity or Area</th>
<th>Hazards</th>
<th>Describe Harm that Could Occur</th>
<th>Significant Hazard? (Yes/No)</th>
<th>Eliminate?</th>
<th>Isolate?</th>
<th>Minimise?</th>
<th>Control Measures</th>
<th>Review Frequency</th>
<th>Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible materials</td>
<td>Fire/heat</td>
<td>• Fatality</td>
<td>Yes</td>
<td>Isolate</td>
<td>Minimise</td>
<td></td>
<td>• Fire warning and protection systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Serious Harm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Identification, storage and segregation procedure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Burns and Scalds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Training.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site hazards</td>
<td>Environmental Health Hazards e.g. dust, biological, fumes, noise, vibration</td>
<td>• Serious Harm</td>
<td>Yes</td>
<td>Isolation</td>
<td>Minimise</td>
<td></td>
<td>• Extraction systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Misting systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Health monitoring.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Environmental monitoring.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• PPE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Rubber vibration mats for workstations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual handling</td>
<td></td>
<td>• Serious Harm</td>
<td>Yes</td>
<td>Minimise</td>
<td></td>
<td></td>
<td>• Mechanical lifting devices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strains / Sprains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Training.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• PPE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pests</td>
<td></td>
<td>• Infection</td>
<td>No</td>
<td>Minimise</td>
<td></td>
<td></td>
<td>• Bait stations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Building maintenance programme.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Bird wires.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Removal of birds’ nests.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor housekeeping</td>
<td></td>
<td>• Serious Harm</td>
<td>Yes</td>
<td>Minimise</td>
<td></td>
<td></td>
<td>• Keep walkways / stairways / access ways clear of debris.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Safe storage of items.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table [number]: Additional hazards for Material Recovery Facilities

This hazard register should be read in conjunction with ‘Appendix 7: Generic hazards associated with all waste collection and processing methods’

<table>
<thead>
<tr>
<th>Work Activity or Area</th>
<th>Hazards</th>
<th>Describe Harm that Could Occur</th>
<th>Significant Hazard? (Yes/No)</th>
<th>Eliminate? Isolate? Minimise?</th>
<th>Control Measures</th>
<th>Review Frequency</th>
<th>Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site traffic</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Isolate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fatality</td>
<td></td>
<td></td>
<td>Minimise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious Harm</td>
<td></td>
<td></td>
<td></td>
<td>Spill Procedures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Workplace Inspections.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slips, trips and falls</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Isolate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious Harm</td>
<td></td>
<td></td>
<td>Minimise</td>
<td>Traffic Management Plan.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Speed limits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Road markings / cones / barriers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Signage &amp; direction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tour groups</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Isolate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious Harm</td>
<td></td>
<td></td>
<td>Minimise</td>
<td>Fall protection and/or restraint systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Anti slip treads on stairs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Don’t walk on recyclable and waste materials.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Guards and handrails.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clean liquid spillage from baling areas.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table [number]: Additional hazards for Material Recovery Facilities

This hazard register should be read in conjunction with ‘Appendix 7: Generic hazards associated with all waste collection and processing methods’

<table>
<thead>
<tr>
<th>Work Activity or Area</th>
<th>Hazards</th>
<th>Describe Harm that Could Occur</th>
<th>Significant Hazard? (Yes/No)</th>
<th>Eliminate? Isolate? Minimise?</th>
<th>Control Measures</th>
<th>Review Frequency</th>
<th>Review Date</th>
</tr>
</thead>
</table>
| Visitors including children and contractors | Visitors including children and contractors | • Fatality  
• Serious Harm | Yes | Minimise | Contractor management systems.  
Accompany visitors.  
Direction, monitoring and assistance for customers. | | | |
| Sorting | Handling recyclables and sharp objects | • Serious Harm | Yes | Eliminate Minimise | Automated sorting.  
Minimise handling frequency in work process.  
Vaccinations.  
PPE. | | | |
| Poor ergonomics | Poor ergonomics | • Discomfort, Pain & Injury | No | Minimise | Workstation assessment.  
Workstation setup (height, width).  
Anti-Fatigue Mats.  
PPE.  
Conveyor speed control.  
Early reporting procedures. | | | |
| Hazardous substance and dangerous goods | Hazardous substance and dangerous goods | • Serious Harm | Yes | Isolate Minimise | Identification and shut down procedures.  
Segregation of incompatible substances.  
Trained operators.  
Approved handlers.  
Emergency procedures. | | | |
### Table [number]: Additional hazards for Material Recovery Facilities

This hazard register should be read in conjunction with ‘Appendix 7: Generic hazards associated with all waste collection and processing methods’

<table>
<thead>
<tr>
<th>Work Activity or Area</th>
<th>Hazards</th>
<th>Describe Harm that Could Occur</th>
<th>Significant Hazard? (Yes/No)</th>
<th>Eliminate? Isolate? Minimise?</th>
<th>Control Measures</th>
<th>Review Frequency</th>
<th>Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Use, maintenance and cleaning of mobile plant. | Mobile plant, for example forklifts, loaders, excavators | • Fatality  
• Serious Harm | Yes | Isolate Minimise | • Emergency PPE available.  
• Handling, storage and disposal procedures. |                  |            |
|                       |         |                                |                               |                                |                 |                  |            |
| Use, maintenance and cleaning of plant and equipment. | Stationary plant and equipment, for example balers or conveyors | • Fatality  
• Serious Harm | Yes | Eliminate Isolate Minimise | • Risk assess to determine if elimination of hazards possible.  
• Guards, interlocks, emergency stops, alarms.  
• Lock Out Tag Out.  
• Scheduled preventative maintenance.  
• Pre start check.  
• Trained, authorised and competent operators. |                  |            |
Table [number]: Additional hazards for Material Recovery Facilities
This hazard register should be read in conjunction with ‘Appendix 7: Generic hazards associated with all waste collection and processing methods’

<table>
<thead>
<tr>
<th>Work Activity or Area</th>
<th>Hazards</th>
<th>Describe Harm that Could Occur</th>
<th>Significant Hazard? (Yes/No)</th>
<th>Eliminate? Isolate? Minimise?</th>
<th>Control Measures</th>
<th>Review Frequency</th>
<th>Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Operating procedures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Signs and labels.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• scaffolding/handrails work positioning systems, fall restraint or arrest systems.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>