



Government of **Western Australia**  
Department of Mines, Industry Regulation and Safety  
**Resources Safety**

## **Fixed plant audit – guide**

**Approved: 27 January 2016**

1 Adelaide Terrace, East Perth WA 6004  
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004  
Telephone: (08) 9358 8002  
ResourcesSafety@dmirs.wa.gov.au  
[www.dmirs.wa.gov.au](http://www.dmirs.wa.gov.au)

# Table of contents

- Introduction ..... 2**
- 1 Conveyors..... 3**
- 2 Crushers ..... 6**
- 3 Rotating mills..... 8**
- 4 Walkways and platforms ..... 8**
- 5 Access ladders and stairways ..... 10**
- 6 Electrical installations ..... 12**
- 7 Cleaning arrangements ..... 14**
- 8 Plant under pressure ..... 16**

## Introduction

This document was reformatted in November 2015. At this time no material changes were made to the content of the guide, which was originally published in February 2008 under the title *Guide to fixed plant HIF audit 2008*.

*Note: The Safety Regulation System (SRS) has replaced the AXTAT system and all reporting is done online through SRS.*

# 1 Conveyors

## Conveyors

Point	Standard	Guideline
1.1	Guards are installed to prevent a trapping hazard at the nip points of conveyor head and tail pulleys.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor head and tail pulleys. Refer to MSIR 4.4(3).</p>
1.2	Guards are installed to prevent a trapping hazard at the nip points of conveyor impact idler rollers.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor impact idlers. Refer to MSIR 4.4(3).</p>
1.3	Guards are installed to prevent a trapping hazard at the nip points of accessible conveyor return idler rollers.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor return idlers. Accessible is where the idler roller is between 0.5 and 2.4 metres of a floor level. Refer to MSIR 4.4(3).</p>
1.4	An emergency stop device is provided along the accessible length of a conveyor.	<p><b>Intent:</b> To provide an effective mechanism for stopping the conveyor in the event of an emergency.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor installations.</p>

1.5	A means of access is provided for the inspection and maintenance of all sections of a conveyor.	<p><b>Intent:</b> To ensure that access is provided for routine inspection and maintenance of a conveyor system.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> Inspect a sample of conveyor installations. Interview personnel.</p>
1.6	Conveyor belt take-up devices are guarded.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor installations. Refer to MSIR 4.4(3).</p>
1.7	Conveyor drives are guarded.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of conveyor installations. Refer to MSIR 4.4(3).</p>
1.8	The accesses to lubrication points are remote from the moving parts of a conveyor.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> Inspect the access to lubrication points on a sample of conveyors. Interview personnel.</p>
1.9	Lighting is provided along the access walkways, at transfer points and at the drive and return heads of conveyors.	<p><b>Intent:</b> To verify that moving machinery is illuminated at all times.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect conveyor lighting installations. Refer to MSIR 13.6(1).</p>

1.10	Anti - runaway devices are fitted on inclined conveyors.	<p><b>Intent:</b> To prevent the uncontrolled movement of an inclined conveyor after the power is cut off for whatever reason.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> Inspect a sample of inclined conveyor installations. Interview personnel.</p>
1.11	Pre-start warnings are provided prior to the starting up of conveyors.	<p><b>Intent:</b> To alert employees when moving machinery is about to start up.</p> <p><b>Personnel:</b> Plant employees.</p> <p><b>Method:</b> Where possible observe the start up of conveyor systems. Interview personnel.</p>

## 2 Crushers

### Crushers

Point	Standard	Guideline
2.1	Signs requiring the wearing of eye and hearing protection are located at all the entrances to crusher areas.	<p><b>Intent:</b> To verify that persons entering crusher areas are warned as to the hazards present.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the signage at crushing plant entrances. Refer to MSIR 4.10(1)(b).</p>
2.2	Guards are installed at crusher drives.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the drive guards at crushing plants. Refer to MSIR 4.4(3).</p>
2.3	Personnel who operate crushers have been advised as to the hazards of tramp metal and other items being expelled from crusher jaws.	<p><b>Intent:</b> To ensure that personnel working in and around crushing plants are aware of the tramp material hazards associated with crushing operations.</p> <p><b>Personnel:</b> Plant operators.</p> <p><b>Method:</b> Interview personnel.</p>
2.4	Documented safe work procedures are provided for the removal of material that has become jammed in a crusher.	<p><b>Intent:</b> To ensure that safe work procedures are in place for the release of crusher blockages.</p> <p><b>Personnel:</b> Plant operators.</p> <p><b>Method:</b> View procedures. Interview personnel.</p>
2.5	Personnel have been trained in the safe procedures for removing jammed materials from a crusher.	<p><b>Intent:</b> To ensure that personnel who are required to free crusher blockages have been trained.</p> <p><b>Personnel:</b> Plant operators.</p> <p><b>Method:</b> Sight training records. Interview personnel.</p>

2.6	Documented safe work procedures are provided for crusher maintenance.	<p><b>Intent:</b> To ensure that there are safe work procedures for carrying out regular crusher maintenance.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> View procedures. Interview personnel.</p>
-----	---	---

### 3 Rotating mills

#### Rotating mills

Point	Standard	Guideline
3.1	Mill drives and other rotating elements are guarded.	<p><b>Intent:</b> To protect employees from inadvertent contact with moving machinery parts.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the mill drives. Refer to MSIR 4.4(3).</p>
3.2	Documented safe work procedures are provided for mill maintenance.	<p><b>Intent:</b> To ensure that there are safe work procedures for carrying out regular mill maintenance.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> View procedures. Interview personnel.</p>

### 4 Walkways and platforms

#### Walkways and platforms

Point	Standard	Guideline
4.1	Fixed plant has platforms and walkways installed for everyday operational purposes.	<p><b>Intent:</b> To verify that all sections of the plant are easily accessible for normal operational purposes.</p> <p><b>Personnel:</b> Plant operators.</p> <p><b>Method:</b> Inspect the plant accesses. Interview personnel. Refer to MSIR 6.2(2)(c).</p>
4.2	Fixed plant has platforms and walkways provided for maintenance and/or cleaning purposes.	<p><b>Intent:</b> To verify that all sections of the plant are easily accessible for maintenance and/or cleaning purposes.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> Inspect the plant accesses. Interview personnel. Refer to MSIR 6.2(2)(c).</p>

4.3	Platforms and walkways are no less than 600mm in width.	<p><b>Intent:</b> To verify that there is sufficient space for walking.</p> <p><b>Personnel:</b> N/A.</p> <p><b>Method:</b> Inspect the plant platforms and walkways. Refer to AS1657 section 3.</p>
4.4	Guards and handrails are provided for platforms and walkways.	<p><b>Intent:</b> To protect employees from the risks of falling from a height.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the plant platform and walkways. Refer to MSIR 4.4(1). Refer to AS1657 section 3.</p>
4.5	Platforms and walkway have kick boards fitted.	<p><b>Intent:</b> To prevent objects from inadvertently falling from an upper level.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the plant platforms and walkways. Refer to AS1657 section 3.</p>
4.6	Platforms and walkways are free from trip hazards.	<p><b>Intent:</b> To ensure that the risks of tripping and falling are minimised.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the plant platforms and walkways.</p>
4.7	Inclined walkways have cleats installed or are fitted with a non - slip type material.	<p><b>Intent:</b> To ensure that the risks of slipping and falling are minimised.</p> <p><b>Personnel:</b> N/A.</p> <p><b>Method:</b> Inspect any inclined walkways.</p>

## 5 Access ladders and stairways

### Access ladders and stairways

Point	Standard	Guideline
5.1	Stairway width is not less than 600 mm.	<p><b>Intent:</b> To verify that there is sufficient foot space when climbing a stairway.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant stairways. Refer to AS1657 section 4.</p>
5.2	Step rises on stairways are between 150 and 215 mm and are of a uniform dimension.	<p><b>Intent:</b> To verify that the height of stairway steps is regular and not excessive.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant stairways. Refer to AS1657 section 4.</p>
5.3	Step goings on stairways are between 215 and 305 mm and are of a uniform dimension.	<p><b>Intent:</b> To verify that the depth of stairway steps is regular and not restrictive.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant stairways. Refer to AS1657 section 4.</p>
5.4	The vertical clearance between the tread nosing on stairways and overhead obstructions is not less than 2000 mm.	<p><b>Intent:</b> To verify that the risk of injury to the head when climbing a stairway is minimised.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant stairways. Refer to AS1657 section 4.</p>

5.5	At least one side of a stairway is provided with a handrail which is located on the exposed side.	<p><b>Intent:</b> To verify that three point contact is available when climbing a stairway.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant stairways. Refer to AS1657 section 4.</p>
5.6	Where there is a fall hazard associated with a rung type ladder cages or guards have been installed.	<p><b>Intent:</b> To verify that the risk of falling from a height when climbing a ladder is minimised.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> 1657 only requires installation of ladder cages when a height of 6000 mm is exceeded. This is still considered to be a significant hazard and it is suggested that a cage or other fall arrest device is installed where it is possible to install one. This will require a cage on any ladder in excess of about 2.4 metres. Refer to MSIR 4.4(2)(a).</p>
5.7	The stiles of a step through ladder extend at least 900 mm above the landing.	<p><b>Intent:</b> To verify that three point contact is available at all positions on the ladder.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant ladders. Refer to AS1657 section 5.</p>
5.8	The spacing of ladder rungs is between 250 and 300 mm and is uniform, with rungs no less than 20mm in diameter and preferably not vertical.	<p><b>Intent:</b> To verify that the space between ladder rungs is regular and not excessive and the rungs will not sag with use.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of plant ladders. Refer to AS1657 section 5.</p>

## 6 Electrical installations

### Electrical installations

Point	Standard	Guideline
6.1	Individual items of fixed plant have an electrical isolating device.	<p><b>Intent:</b> To verify that individual items of plant can be isolated by a dedicated isolator.</p> <p><b>Personnel:</b> Electrical supervisor, plant operators.</p> <p><b>Method:</b> Inspect the MCC's related to a sample of key items of plant and identify the isolators. Refer to MSIR 5.29.</p>
6.2	Isolation switches are clearly labelled.	<p><b>Intent:</b> To clearly identify which isolator controls an individual item of plant.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of isolator labels.</p>
6.3	Isolation switches have a provision for being locked in the isolated position.	<p><b>Intent:</b> To provide the means of preventing an item of plant from being inadvertently placed in operation.</p> <p><b>Personnel:</b> Plant operators, maintenance personnel.</p> <p><b>Method:</b> Inspect a sample of isolators. Interview personnel.</p>
6.4	Isolation switches have a provision for the attachment of tags.	<p><b>Intent:</b> To provide the means of identifying an isolated item of plant by the attachment of personal and other danger tags.</p> <p><b>Personnel:</b> Plant operators, maintenance personnel.</p> <p><b>Method:</b> Inspect a sample of isolators. Interview personnel.</p>
6.5	Electrical cables are adequately supported.	<p><b>Intent:</b> To ensure that live electrical cables are not subject to external forces capable of causing damage.</p> <p><b>Personnel:</b> Electrical supervisor.</p> <p><b>Method:</b> Inspect a sample of electrical cable installations.</p>

6.6	Electrical cables and equipment are not damaged.	<p><b>Intent:</b> To ensure that the risks of fire or danger to personnel are minimised.</p> <p><b>Personnel:</b> Electrical supervisor.</p> <p><b>Method:</b> Interview personnel.</p>
-----	--	---

## 7 Cleaning arrangements

### Cleaning arrangements

Point	Standard	Guideline
7.1	The hazards associated with the manual cleaning of fixed plant have been determined.	<p><b>Intent:</b> To verify that safe work procedures for cleaning can be developed in confidence.</p> <p><b>Personnel:</b> Senior manager, maintenance personnel.</p> <p><b>Method:</b> View hazard analysis and safe work procedures. Interview personnel. Refer to MSIR 6.17 and 6.27.</p>
7.2	The hazards associated with the mechanical cleaning of fixed plant have been determined.	<p><b>Intent:</b> To verify that safe work procedures for cleaning can be developed in confidence.</p> <p><b>Personnel:</b> Senior manager, maintenance personnel.</p> <p><b>Method:</b> View hazard analysis and safe work procedures. Interview personnel. Refer to MSIR 6.17 and 6.27.</p>
7.3	The hazards associated with cleaning down fixed plant with a water hose have been determined.	<p><b>Intent:</b> To verify that safe work procedures for cleaning can be developed in confidence.</p> <p><b>Personnel:</b> Senior manager, maintenance personnel.</p> <p><b>Method:</b> View hazard analysis and safe work procedures. Interview personnel. Refer to MSIR 6.17 and 6.27.</p>
7.4	The hazards associated with cleaning fixed plant whilst it is in operation have been determined.	<p><b>Intent:</b> To verify that safe work procedures for cleaning can be developed in confidence.</p> <p><b>Personnel:</b> Senior manager, maintenance personnel.</p> <p><b>Method:</b> View hazard analysis and safe work procedures. Interview personnel. Refer to MSIR 6.21.</p>

7.5	Spillage around fixed plant does not present a hazard.	<p><b>Intent:</b> To ensure that spillage is controlled and not allowed to accumulate such as to present a hazard.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect the plant for spillage.</p>
-----	--	---

## 8 Plant under pressure

### Plant under pressure

Point	Standard	Guideline
8.1	Pressure vessels comply with a recognised standard.	<p><b>Intent:</b> To verify that the hazards of pressure vessel usage are minimised.</p> <p><b>Personnel:</b> Maintenance manager.</p> <p><b>Method:</b> Inspect a sample of vessel design and registration documentation. Refer to MSIR 6.26 and 6.33.</p>
8.2	Pressure vessels are inspected and maintained.	<p><b>Intent:</b> To verify that the hazards of pressure vessel usage are minimised.</p> <p><b>Personnel:</b> Maintenance manager.</p> <p><b>Method:</b> Inspect a sample of vessel inspection and maintenance records. Refer to MSIR 6.26 and 6.33.</p>
8.3	Pressure piping is adequately supported.	<p><b>Intent:</b> To ensure that pressure piping is sufficiently supported such that additional stresses are not applied.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of installed pressure pipes. Are the pipes subject to excessive flexing due to a lack of support?</p>
8.4	Pressure piping is labelled in order to identify the contents, direction of flow and line pressure.	<p><b>Intent:</b> To ensure that the contents and usual flow direction in pressure piping can be identified without having to break the line.</p> <p><b>Personnel:</b> N/A</p> <p><b>Method:</b> Inspect a sample of pressure piping. The pipe contents may be identified by labels or colour coding and flow direction should also be indicated at strategic positions along the route.</p>

8.5	Flexible hose is rated for the maximum available operating pressure.	<p><b>Intent:</b> To ensure that the hoses in use are compatible with the available pressures.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> View the hoses in use and cross reference the hose pressure ratings with the available pressure in the pipe work.</p>
8.6	Flexible hose is rated for the temperatures and types of fluid to be conveyed.	<p><b>Intent:</b> To ensure that the hoses in use are compatible with the chemical and physical properties of their contents.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> View the hoses in use and cross reference the hose ratings with the fluids and temperatures.</p>
8.7	Flexible hose connections are designed such that they are incapable of being unintentionally disconnected.	<p><b>Intent:</b> To ensure that hose connectors facilitate the installation of safety clips or other such locking devices.</p> <p><b>Personnel:</b> N/A.</p> <p><b>Method:</b> Inspect a sample of flexible hose connections.</p>
8.8	The specifications of the flexible hose fitting manufacturer are compatible with those of the flexible hose manufacturer and any assembly is done in accordance with the manufacturer's instructions.	<p><b>Intent:</b> To ensure that all flexible hose and fitting assemblies are compatible.</p> <p><b>Personnel:</b> Maintenance personnel.</p> <p><b>Method:</b> View the hoses in use and cross reference the specifications of hose and fittings.</p>