

The Sugar Milling Operations Industry Code of Practice 1999

Important Information about this Industry Code of Practice

The *Sugar Milling Operations Industry Code of Practice 1999*:

1. Was made on 4 August 1999
2. Commences on 1 September 1999.
3. Expires on 1 September 2004.

What is this Industry Code of Practice About?

The purpose of the Sugar Milling Operations Industry Code of Practice is to give practical advice about ways to manage exposure to risks identified as typical in sugar milling work.

Workplace Health and Safety Obligations and the *Workplace Health and Safety Act 1995*

The *Workplace Health and Safety Act 1995* imposes obligations on people at workplaces to ensure workplace health and safety. Workplace health and safety is ensured when persons are free from death, injury or illness created by workplaces, workplace activities or specified high risk plant. Ensuring workplace health and safety involves identifying and managing exposure to the risks at your workplace.

How Can I Meet My Obligations?

Under the Act, there are three types of instruments made to help you meet your workplace health and safety obligations - regulations, advisory standards and industry codes of practice.

1. If there is a REGULATION about a risk - you must do what the regulation says.
2. If there is an ADVISORY STANDARD or an INDUSTRY CODE OF PRACTICE about a risk - you must either:
 - do what the standard or code says; or
 - adopt and follow another way that manages exposure to the risk and take reasonable precautions and exercise proper diligence about the risk.

If there is NO regulation, advisory standard or industry code of practice about a risk - you must choose any appropriate way and take reasonable precautions and exercise proper diligence to ensure you meet your obligation.

NOTE:

There may be additional risks at your workplace which have not been specifically addressed in this industry code of practice. You are still required under the Act to identify and assess these risks and ensure that control measures are implemented and reviewed to eliminate or minimise exposure to these risks.

Part 6 of this document contains information on how to carry out a risk management process for risks which have not been specifically covered by this industry code of practice.

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THE SUGAR MILLING OPERATIONS INDUSTRY CODE OF PRACTICE

PART 1. INTRODUCTION

1 General

1.1 Objective

The objective of the *Sugar Milling Operations Industry Code of Practice* is to provide a safer working environment for all who work in sugar mills by providing practical advice about the management of risks arising from all activities associated with the sugar milling industry in Queensland.

1.2 How to use this Code

The *Sugar Milling Operations Industry Code of Practice* (Sugar Milling Safety Code) has been written to assist mills to meet their obligations with respect to workplace health and safety, and to assist generally with the provision and maintenance of a safe working environment in Queensland sugar mills.

The Code does not attempt to provide a comprehensive step by step guide to ensure workplace health and safety. Although attempts have been made to keep the code as relevant as possible, it is acknowledged that the individual circumstances of companies will continue to dictate the type of preventative or control measures which are implemented to meet management's obligations under the workplace health and safety legislation. This Code provides a useful guide to the particular risks which sugar mill management and workers need to be aware of, and to methods of addressing those risks.

Due to the variety of situations encountered at mills it is difficult to be prescriptive in an industry wide document. For this reason care has been taken to limit prescriptive or directive language to situations where the requirement stems from a direct legal obligation under the *Act* or a *Regulation*. For the purpose of this code such prescriptive provisions shall be indicated by the terms "must" or "shall" and by no other terms.

Conversely, where non-prescriptive language such as "may" or "should" is used, or if any other form of language apart from "must" or "shall" is used, then the provision is intended to be a recommendation or suggestion, which may be implemented at discretion, based on an assessment of its suitability at the particular workplace.

1.3 Disclaimer

The contents of this Sugar Milling Safety Code do not constitute legal advice and should not be relied upon as such. Formal legal advice should be sought for appropriate matters.

1.4 Expiry Date

This code shall operate from 1 September 1999 and expire on 1 September 2004

2 Legislation

2.1 Statute Law

The statute law that governs workplace health and safety in Queensland is the *Workplace Health and Safety Act 1995* as amended (the *Act*). Compliance with the *Act* is mandatory and schedule 1 of the *Act* sets out the list of offences and penalties for proven non-compliance.

2.2 Regulation

A regulation is subordinate legislation. Section 38 of the *Act* covers regulations that include matters previously covered under compliance standards. Section 38 states:

38(1) The Governor in Council may make regulations under this Act.

(2) A regulation may-

- (a) deal with matters of an administrative nature; or*
- (b) prohibit exposure to risk; or*
- (c) prescribe ways to prevent or minimise exposure to risk.*

(3) A regulation may-

- (a) prescribe offences for a breach of a regulation; and*
- (b) fix a maximum penalty of not more than 40 penalty units for the breach.*

(4) A regulation may declare something to be a workplace health and safety obligation imposed on a person for this Act.

2.3 Advisory Standards

The making of advisory standards is covered under section 41 of the *Act*. Section 41 states:

41.(1) The Minister may make-

- (a) advisory standards that state ways to manage exposure to risks common to industry; and*
- (b) industry codes of practice that state ways to manage exposure to risks identified by a part of industry as typical in the part of industry.*

(1A) The standard or code of practice must include a provision that states the standard or code of practice expires 5 years after its commencement.

(2) The Minister must notify the making of an advisory standard or industry code of practice.

(3) The Minister must ensure that a copy of each advisory standard or code of practice and any document applied, adopted or incorporated by the standard or code of practice is made available for inspection, without charge, during normal business hours at each department office dealing with workplace health and safety.

(4) A notice mentioned in subsection (2) is subordinate legislation.

2.4 Industry codes of practice

Industry codes of practice were introduced under the *Workplace Health and Safety Amendment Act 1997*. An industry code of practice which is made by the Minister under section 41 of the *Workplace Health and Safety Act 1995* (the *Act*) has the same standing as an advisory standard made under section 41 of the *Act*. This means that a person following an industry code of practice has the same protection as that of an advisory standard under the *Act*. The statutory defences are covered under section 37 of the *Act* that states:

2.4.1 Defences for div 2 or 3

37. (1) It is a defence in a proceeding against a person for a contravention of an obligation imposed on a person under division 2 (obligation of employers and others) or 3 (obligation of workers and other persons) for the person to prove--

- (b) if an advisory standard or industry code of practice has been made stating a way or ways to identify and manage exposure to a risk-*
 - (i) that the person adopted and followed a stated way to prevent the contravention;*

2.5 Australian standards

Australian Standards provide useful information which may assist you to meet your obligations. All care should be taken when referring to Australian Standards detailed in the document to ensure it is the current standard.

2.6 Reference

Workplace Health and Safety Act, Part 4, Divisions 1 and 2.

3 Obligations for Sugar Mills

3.1 Management

The management's obligations as set out in section 28 of the *Act* are:

- to ensure the workplace health and safety of each of the mill workers at work; and
- to ensure his or her own workplace health and safety and the workplace health and safety of others is not affected by the way the management conducts the mill's undertaking.

The *Sugar Milling Safety Code* is a practical guide for management to discharge their obligations under the *Act*.

3.2 Workers and Others

This section is concerned with workers and other persons at workplaces controlled by the mill. Workplaces include welding and fitting workshops, factory areas, control rooms, locos, cane railways and sidings, effluent treatment plants and administration buildings.

Workers are those persons receiving wages and salaries paid by the mill. Any person working at a mill under a contract for service is not a worker under this section but comes under the general category of 'others'.

Examples of others include members of the mill supplier's committee, cane growers, contractors (incl. harvesting contractors, cane testers) and sub-contractors, sales representatives and local delivery persons.

The obligations of workers and others are covered under section 36 of the *Act*. The relevant obligations under this section are:

- to comply with the instructions given for workplace health and safety at the workplace by the management at the mill;
- for a worker - to use personal protective equipment if the equipment is provided by the management and the worker is properly instructed in its use;
- not to wilfully or recklessly interfere with or misuse anything provided for workplace health and safety at the mill;
- not to wilfully place at risk the workplace health and safety of any person at the mill; and
- not to wilfully injure himself or herself.

The management of a mill can assist others to comply with their obligations by giving them appropriate instructions and procedures for the part of the factory that they are likely to visit. Compliance can be assisted by:

- visitor registration;
- provision of a worker to accompany the person; and
- ensuring the person has appropriate clothing, footwear and PPE.

3.3 Principal contractor

A principal contractor is required for any construction workplace at a mill. If no person is appointed as principal contractor, then the milling company is the principal contractor. (Refer to Appendix A - Dictionary for a definition of a construction workplace.)

The obligations of a principal contractor are set out in section 31 of the *Act*. The obligations are:

- to ensure the orderly conduct at the construction workplace to the extent necessary:
 - to ensure workplace health and safety at the workplace; and
 - to assist the discharge of workplace health and safety obligations of an employer or self-employed person;

- to ensure that persons at the workplace are not exposed to risks from:
 - something that has been provided for the general use of persons at the workplace for which no other person owes a workplace health and safety obligation; or
 - a hazard at the workplace for which no other person owes a workplace health and safety obligation;
- to ensure that workplace activities at the workplace are safe and without risk of injury or illness to members of the public at or near the workplace;
- to provide safeguards and take safety measures prescribed under a regulation made for principal contractors.

The principal contractor is required to observe the safety practice at the mill and, by complying with the mill's practices, can help satisfy his or her obligations.

3.4 Suppliers and others

Section 32 of the *Act* sets out the obligation of designers, manufacturers, importers and suppliers of plant. When supplying items to the mill the supplier must abide by the applicable sections of the mill's policy and procedures.

3.5 Reference

Workplace Health and Safety Act (1995)

Part 1, Division 4, Sections 13 and 14.

Part 3, Divisions 2, 3 and 4, Sections 28, 31 and 36.

Part 4, Division 4, Section 41.

4 Not Allocated

PART 2. SAFETY MANAGEMENT SYSTEM

5 Managing health and safety

5.1 Safety commitment

To be effective, a safety management system requires the commitment and participation of all levels in the mill organisation. Gaining a commitment from workers requires management to demonstrate a corporate commitment through leadership and example. A demonstrable safety commitment can include:

- a commitment by management through example, financial support and priority of business;
- accountability for safety as defined in job or position descriptions;
- establishment of a safety program and the marketing and monitoring of all aspects of that program;
- personal example at all levels; and
- compliance with safe work practices and procedures.

5.2 Recommendations

Management should consider the implementation of a health and safety management system that may include the following elements:

- A statement of intent or the formulation of a health and safety policy by management to ensure health and safety at the workplace.
- A safety plan, policy or strategy which may include:
 - objectives, targets and performance indicators;
 - use of safe work systems and practices;
 - promotion of safety; and
 - training.
- A risk management system to minimise the risks to health and safety by:
 - hazard identification;
 - risk assessment; and
 - risk control.
- Consultation with employees.
- Measurement and evaluation of health and safety performance.
- Regular review and improvement.

5.3 References

Standards Australia. AS/NZS 4804 Occupational health and safety management systems – General guidelines on principles, systems and supporting techniques.

6 Risk management

A person in control of a workplace has a statutory obligation to ensure the workers and others are free from the risk potential of hazards associated with workplace practices and situations. Workplace health and safety can generally be ensured by implementing a risk management approach to minimise exposure to a hazard. Section 22 of the *Act* identifies the need to establish a risk management plan.

It is not intended to provide a detailed analysis of risk management techniques in this document but merely to outline the basic procedures to be followed.

The main elements of a risk management approach to workplace health and safety are:

1. Hazard identification
2. Risk assessment
3. Risk control
4. Control review and monitor

It is important to document all information relating to the four steps as a permanent record.

6.1 Hazard Identification

There are a number of methods of identifying hazards associated with a workplace or a work procedure. Depending on the reason for the assessment, a combination of methods may give the most complete results. The methods include:

- *Hazard inspections.* A walk through survey preferably using a sample checklist can identify sources of hazards.
- *Historical data.* Incident reports and first aid records can be analysed to identify problem areas. However prediction cannot rely on historical data alone.
- *Activity evaluation.* Each separate activity that will be undertaken as part of the work procedure should be analysed to identify hazards associated with:
 - plant likely to be used;
 - hazardous substances that may be required;
 - work processes such as manual handling, repetitive actions, after hours commitments;
 - workplace environment including poor lighting, confined spaces, ventilation, atmospheric contamination, heat, humidity, etc.;
 - travel requirements and modes of transport.
- *Employee consultation.* There is no substitute for a group of people who know the processes and environment sitting down and together cataloguing the hazards and risks that may be faced by the work team. Consultation with workers is a most effective means of identifying hazards in the workplace. Workers are often in the best position to identify hazards and assess the likely outcomes of the hazard events. They often know the best risk control options.
- *Product information.* Material safety data sheets, product labels, and information from manufactures and suppliers are essential sources of information regarding the hazards associated with chemical substances and plant.
- *Safety literature.* These include copies of the relevant *Act* and *Regulation*, Codes of Practice, Australian Standards, Journals, health and safety databases.
- *External resources.* Specialist practitioners from industry, government agencies, other mills, unions and private consultants are valuable sources of information regarding workplace hazards.

6.2 Risk Assessment

There are a number of methods available to quantify the risk associated with a hazard. A method should be selected that management and workers are familiar with. All methods calculate a 'Risk Score' which is equal to the product of the Consequence and the Exposure and the Probability *i.e.*

$$\text{Risk Score} = \text{Consequence} \times \text{Exposure} \times \text{Probability}$$

In quantifying the risk, decide on the rating of *Consequence*, *Exposure* and *Probability* in that order. The calculated risk score can be used to establish the priority of corrective action.

The risk score can then be used to make a judgement about whether the level of risk is acceptable or not. The risk score should only be used as a basis for reasoned judgement about a risk and should be interpreted with caution, as it has certain limitations. For instance, it is not possible to describe complex human behaviour by numerical means.

If the risk score is above ***Risk Perhaps Acceptable*** it should be reduced to the lowest level that is practicable.

6.3 Risk control

The results of the risk assessment are used to determine what control measures may be implemented, or actions to take, in order to eliminate or reduce the risks to an acceptable level. Control measures can be categorised and are **listed in order of preference**:

- *Design* - allows hazards to be designed out, and control measures to be designed in.
- *Elimination* - modifying a process, method, plant or material to eliminate the hazard.
- *Substitution* - replacing the material, method of work or process associated with the hazard with a less hazardous one.
- *Redesign* - redesigning plant or work processes to reduce or eliminate the risk.
- *Separation* - isolating the hazard from people by enclosing, guarding or increasing the distance between people and the hazard.
- *Administration* - controlling the time or conditions of risk exposure. For example, reduce the time spent in noisy environments to establish a lower daily noise dose.
- *Personal protective Equipment (PPE)* - using appropriately designed and properly fitting equipment where other control measures are not practicable.

Note that when control measures of separation, administration and provision of PPE are adopted, the hazard still exists.

Control measures may be divided into short term and long term. The long term aim should always be to eliminate the hazard at the source, but, while attempting to achieve this aim, other short term actions must be used.

Some of the methods that can be used to determine what control measures to adopt include:

- consulting with workers and other staff;
- referring to material safety data sheets, product labels, and instructions from manufactures and suppliers;
and
- referring to specialists and representatives of industry associations, unions and government agencies.

6.4 Control, review and monitor

Before the control measures are applied, the potential effectiveness of the control measures should be assessed *i.e.*:

- would the risk be reduced if that control measure were applied, or
- will the application of a chosen control measure introduce a new hazard.

One of the ways to undertake this review is to re-do steps 1 and 2 of the risk management procedure.

The effectiveness of the control measures should be monitored by observation, first-hand experience and by consulting with the work team members.

Section 22(4) of the Act imposes an obligation on management to ensure the effectiveness of the risk management system and that workers comply with the applied control measures.

6.5 Ongoing risk management

The results of risk management should be updated, whether or not the procedure is complex, and whether or not the results are considered satisfactory.

The risk management procedure should be repeated at intervals and whenever there is reason to suppose the results are no longer valid. Instances where the risk management procedure shall be repeated include:

- new plant is introduced;
- plant is modified so that it differs from the original design;
- there is a change to work procedures or practices;
- the project is relocated to another site;
- a new hazardous substance is introduced into the workplace;
- a change is made in the way a hazardous substance is stored or handled;
- a change is made in a process or procedure which may result in a change of risk; or
- when new information concerning a hazardous property is established.

6.6 Recommendations

- management should ensure that a risk management system is established, implemented and maintained at the workplace;
- all activities concerning risk management should be recorded in a format acceptable to the mill's safety management system;
- the assessment of risks should follow a format that is easily understood by management and workers and training should be provided to ensure the quality of the assessment;
- the method of assessing a risk should be available to any person in the workplace who has been appropriately trained in the assessment of risk;
- encourage all workers to consciously examine all potential hazards relating to their work activities; and
- the risk assessment system should be monitored and audited at regular intervals.

6.7 References

Standards Australia. *AS/NZS 2430 Parts 1-9 – Classification of hazardous areas.*

Standards Australia. *AS/NZS 4360 - Risk Management.*

Standards Australia. *AS/NZS 4804 - Occupational health and safety management systems: General guidelines on principles, systems and supporting techniques.*

Workplace Health and Safety Act 1995; part 2; division 4; section 22.

Department of Training and Industrial Relations. Risk management workbook – Manufacturing industry. V1/6/97.

7 Consultative arrangements

Improving the workplace health and safety performance of a mill requires the cooperation of all workers. Knowledge and experience throughout the workforce is a valuable resource and workers should be encouraged to participate in the development and implementation of the mill's safety management system through consultation and involvement in the setting of objectives and targets.

Involving workers in decisions about changes, and responding to worker's concerns, help to establish common goals between management and workers.

Promotion of consultation between management and workers is a basic concept of the *Act*. The *Act* provides for the election of workplace health and safety representatives and the establishment of workplace health and safety committees.

7.1 Recommendations

A workplace health and safety committee should be established with membership to include:

- the workplace health and safety officer and all workplace health and safety representatives; and
- members nominated by management and workers in accordance with the *Act*.

All work areas or work groups should be adequately represented on the committee.

The committee should have terms of reference and a constitution based on legislative requirements.

Line managers should ensure that worker representatives are given sufficient time to devote to their committee responsibilities.

Management should ensure that all relevant workplace health and safety information is made available to the committee.

The committee's activities should be properly administered and documented. This should include comprehensive minutes of all meetings, follow-up of allocated actions and a process for resolution of disputes within the committee.

The minutes of meetings should be communicated to all workers. Each site should have an effective mechanism to communicate safety notices and information to absent workers on their return.

Special meetings to consult workers on specific issues should be convened as required. Records of these meetings should be kept and distributed as appropriate.

Meetings such as toolbox sessions called for purposes of awareness training and feedback should be led by line managers, supervisors or team leaders, and should include opportunity for discussion and interaction by attendees.

Where appropriate, notice boards should be located in work areas, for posters, promotional material, performance data and specific notices related to health and safety.

Safety improvement plans should be developed in consultation with appropriate workers and communicated to all.

7.2 References

Standards Australia. *AS/NZS 4804 - Occupational health and safety management systems: General guidelines on principles, systems and supporting techniques*.

Workplace Health & Safety Act (1995). Parts 2 and 7.

8 Safe working

8.1 Safe work strategies

The sugar milling industry must comply with a large number of statutory obligations related to workplace health and safety. These obligations need to be identified, assessed and effectively incorporated into strategies designed to achieve compliance and a safe workplace.

These obligatory requirements are imposed both by external entities (controlled from outside the industry) and from within the mill (site specific requirements) and are related to safe work practices and the way work activities are conducted. Generally, these include:

External requirements:

- legislation (Acts and Regulations)
- Australian Standards called up in legislation
- statutory licences
- statutory codes of practices
- industry codes

Internal requirements:

- site policies
- site standards
- business plans
- specific health and safety targets
- improvement plans

8.2 Work orders, safe work procedures and permits

The *Act* imposes an obligation on management to develop safe work procedures to minimise or eliminate the risks associated with particular work activities where hazards exist. The task of a safety management system is to combine the requirements into a comprehensive set of safe work procedures. Workers can then use these safe work procedures and permits to perform their work activities in a safe manner and thereby satisfy their obligations with respect to workplace health and safety.

8.2.1 Example

A supervisor would issue a **work order** to have a conveyor in a bagasse bin repaired. The work order will include copies of or references to appropriate **safe work procedures** that would be required for all the activities that may be executed in repairing the conveyor. If significant risks exist at the work site e.g. the work is to be performed in a confined space then a **safe work permit** (see figure 8.1) will be issued once all the appropriate conditions for entry to the specific confined space have been satisfied.

Figure 8.1 Example of a safe work permit

Permit Number

JSP No.....

Plant

<p>Please note This permit is only valid for one job</p>						
<p>What Plant, machinery or equipment is being worked on</p> <p>Location</p>						
Description of task						
Name of Competent Person issuing the Safe Work Permit						
Safe Work Permit issued to (team or individuals)						
<p>Does the task involve</p> <p> <input type="checkbox"/> DECONTAMINATION <input type="checkbox"/> ISOLATION <input type="checkbox"/> HOT WORK <input type="checkbox"/> CONFINED SPACE <input type="checkbox"/> WORKING AT HEIGHTS <input type="checkbox"/> EXCAVATION & BUILDING WORK <input type="checkbox"/> HIGH VOLTAGE EQUIPMENT <input type="checkbox"/> PERSONAL PROTECTIVE EQUIPMENT (Special Occasions) <input type="checkbox"/> OTHER PROCEDURE (SPECIFY) </p> <p>Please tick the required check boxes when the relative checks for these Procedures involved have been completed</p>						
Approval to commence work	 / ... /		
		Competent Person	Date	Time		
<p>Each Person working on the task must sign on and off</p>						
Sign On						
Sign Off						
Sign On						
Sign Off						
Sign On						
Sign Off						
Task Completed	<p>..... ... / ... /</p> <p style="text-align: center;">Competent Person Date Time</p>					

9 Training

The aim of this section is to ensure:

- WH&S training needs for all mill personnel and contractors are identified and met;
- training appropriate to each person's job is conducted (including appropriate re-training); and
- all training records are kept.

The effective implementation and maintenance of a safety management system depends on the safety consciousness and competency of management and workers. Training is an important means of ensuring that the appropriate awareness and competency levels required to achieve the management system objectives are met.

Training is an important component in ensuring that managers and supervisors are knowledgeable about their legislative obligations, risk management processes and responsibilities.

Workers should be competent to handle the task to which they are assigned, especially where there may be a significant degree of risk present in performing the task as a normal duty as well as during shut-down procedures and unplanned or emergency situations.

WH&S training is typically provided at certain key times including:

- at induction for new employees;
- as ongoing or refresher training;
- on transfer of workers to new jobs and/or work sites;
- on movement into managerial or supervisory positions; and
- when new work processes, machinery, technology, materials and substances are being introduced.

9.1 Recommendations

Training that is specific to the risks, available control and the safety management system implemented at the mill, should be provided to all personnel.

Procedures should be in place to ensure that competencies are developed and kept up-to-date for those tasks where hazards and risks have been identified.

A training needs analysis to identify the training needs of all personnel, in relation to the tasks they need to perform and their working environment, should be considered. The identified training needs should be prioritised, documented and conducted in accordance with these priorities.

Following the authorisation of a procedure but prior to its implementation, introductory sessions should be conducted for all potential users, covering at least the procedure's scope, objectives and requirements. When changing jobs from one area/section of the factory to another, relevant WH&S training should be considered for the employee.

The training of contractors should be relevant to the contractor's activities and the contractor's potential to affect the health and safety of mill workers and others.

Procedures should be established to document and record training provided and to evaluate its effectiveness. Evaluation may include assessment of trainees at the conclusion of training to ensure competency. Training records should include:

- who has been trained;
- the course content;
- what competencies were achieved, qualifications or skills obtained; and
- identification of the trainer.

Legislative requirements associated with prescribed occupations shall be followed.

Training may include the following, where appropriate for tasks and responsibilities of each worker:

- workplace health and safety policy;
- individual responsibility;
- legislative requirements;
- safe work procedures;
- housekeeping;
- corrective and preventative action;
- incident reporting and investigation;
- communication;
- hazard awareness and identification;
- risk assessment;
- manual materials handling;
- workstation setup and adjustment;
- tool and equipment usage;
- recognition of the intent of signs and warnings;
- emergency response; and
- use, storage and maintenance of personal protective equipment.

9.2 References

Standards Australia. *AS/NZS 4804 - Occupational health and safety management systems: General guidelines on principles, systems and supporting techniques.*

Workplace Health and Safety Regulation. Part 8 – Workplace health and safety plans and workplace health and safety inductions.

10 Measurement and evaluation

Measurement and evaluation are key activities that ensure that a mill is performing in accordance with its safety management system policy, objectives and targets. Measurement and evaluation processes are facilitated by data collection systems, and inspections and audits of mill sites.

10.1 Reporting and investigation of incidents

This section covers the requirements associated with the notification, reporting and investigation of injuries, illnesses, and dangerous events. It covers events that caused or could have caused injury to workers, illness or damage to property.

Information associated with recorded incidents is an important source of data that can be used in any measurement and evaluation process.

The procedures must ensure that incidents are properly notified, reported and investigated so that corrective action can be taken to prevent their recurrence.

10.1.1 Legislative requirements

All notified incident details shall be entered into an incident recording system within three days of the responsible officer becoming aware of the incident. The record must be kept for one year after the last entry. It is suggested that records are kept for a longer period where there is any likelihood of subsequent legal action. Injuries or illnesses resulting from certain hazardous substances must be retained for a longer period that may extend to 30 years.

All serious bodily injuries, work caused illnesses and dangerous events shall be notified as soon as possible and within 24 hours through the mill's reporting system to the Division of Workplace Health and Safety.

Procedures shall be in place to ensure factual notification of all injuries and incidents to the relevant site personnel and outside authorities.

All work injuries, work caused illnesses and dangerous events shall be investigated. Investigations conducted by the Workplace Health and Safety Officer or others at the mill should be conducted in accordance with the site accident/incident investigation procedures.

During the investigation, an analysis should be carried out to identify any health and/or safety management system failure. This would involve an examination of the incident along the following guidelines:

- is there a procedure that covers this area of activity?
- was the person aware that the procedure exists?
- is the procedure adequate (i.e. effective, workable, comprehensive, simple, easy to use)?
- was the procedure properly implemented?
- was the procedure followed?

Following cause analysis, corrective actions should be documented, implemented and monitored. Records of investigations and actions taken shall be maintained with the incident report for the appropriate period.

10.2 Audits

Safety audits assist management to establish and maintain effective systems for managing the risks to the health and safety of workers. These risks arise from exposure to hazards associated with work performed, equipment, materials and substances used, and the general work environment. Audits measure the effectiveness of management systems, safe work procedures, training, records and the safety effort within the mill organisation.

Formal compliance audits are conducted at mill workplaces by inspectors appointed in accordance with the *Act*. Audits can also be initiated by management using internal or external resources. This is a pro-active means of assisting management to assess the current status of the safety management system against established criteria.

Safety audits concentrate primarily on (but are not limited to) the following elements:

- health and safety policy and communication;
- allocation of responsibility/accountability;
- suppliers, sub-contractors and purchasing controls;
- health and safety consultation;
- hazard identification, evaluation and control;
- provision of information;
- training;
- workplace specific issues (manual handling, hazardous substances, plant and noise);
- reporting and investigation;
- emergency response planning.

10.2.1 Audit objectives

The objectives of any audit should be:

- to determine whether activities at a workplace comply with minimum statutory requirements, and whether health and safety management arrangements have been implemented effectively; and
- to identify actions necessary to bring a non-complying workplace into compliance; and
- to establish specific industry performance indicators and allow evaluation of these; and
- to provide information regarding the performance of workplaces within particular industry groups to effectively control the risks to health and safety associated with the hazards in those industries.

10.3 Inspections

Mills should establish and maintain procedures for planning and conducting ongoing inspections, testing and monitoring related to the objectives and targets set as part of the safety management system.

Inspections are physical investigations designed to ensure that matters subject to variable levels of compliance with accepted standards, e.g. housekeeping, equipment condition, use of personal protective equipment, are checked at a frequency sufficient to maintain the standards.

Inspections are normally conducted internally using resources from within the organisation. Health and safety representatives have a statutory right to inspect the workplace or areas of responsibility in accordance with the *Act* and which may be provided for in an agreement with management. Inspections can also be conducted by:

- management; or
- supervisors at all levels; or
- safety officer/coordinator, or their nominees; or
- external resources.

Examples of inspection processes include:

- Inspection of the caustic cleaning process to ensure:
 - the selected controls are implemented and are effective; and
 - operators are aware of the safe work procedures to be followed.
- Inspection of the bin uncoupling/coupling area to ensure that the specific safe work procedures are being followed.

10.3.1 Procedure

In developing a procedure for inspections of the workplace, the following elements should be considered:

- inspection checklists for use in all areas of the mills operations;
- checklist maintenance system to ensure that each checklist remains relevant and adequate;
- selection and use of criteria to determine degree of compliance to ensure objective assessment;
- assignment of responsibility for ensuring routine use of the inspection checklists and follow-up action;
- maintenance of records of inspections and follow-up actions;
- methods of conducting the inspection which may include:
 - visual and/or physical inspection;
 - examination of records or log books; or
 - appropriate testing of items of plant;
- method of reporting the results of an inspection; and
- responsibility and procedure for follow-up actions.

An example of an inspection checklist is given in Appendix 10.A.

10.4 Reference

Workplace Health and Safety Act 1995, Part 3, sections 23-36.
Workplace Health and Safety Regulation, Part 7.
Division of Workplace Health and Safety, *Audit program*.
CCH Planning Occupational Health and Safety 4th Edition, 1996.

Appendix 10.A Example: General inspection checklist

This checklist is included as a guide only and should be modified to suit specific workplace requirements.

WH&S INSPECTION CHECKLIST		
Mill:		
Workplace Location:		Date:
Persons completing inspection:		
Indicate in the following manner:		
✓ Acceptable	x Not Acceptable	N/A Not Applicable
1. Health and Safety Systems		
1.1	WH&S policy displayed	
1.2	Accident Report Book	
1.3	Induction Records	
1.4	Rehabilitation policy available	
1.5	Workplace inspection records	
1.6	Emergency procedures	
1.7	Training records	
1.8	Documented safe work procedures	
1.9	Protective clothing & equipment records	
1.10	MSDS available	
1.11	Health and safety systems manual	
1.12	H & S representatives elected	
1.13	Management safety representative appointed	
2. Housekeeping		
2.1	Work areas free from rubbish and obstructions	
2.2	Surfaces safe and suitable	
2.3	Free from slip/trip hazards	
2.4	Floor openings covered	
2.5	Stock/material stored safely	
2.6	Aisles and walkways – Unobstructed and clearly defined	
2.7	Aisles and walkways – Adequate lighting	
2.8	Aisles and walkways – Vision at corners	
2.9	Aisles and walkways - Wide enough	
3. Electrical		
3.1	No broken plugs, sockets, switches	
3.2	No frayed or defective leads	
3.3	Power tools in good condition	
3.4	No work near exposed live electrical equipment	
3.5	Tools and leads inspected and tagged	
3.6	No strained leads	
3.7	No cable-trip hazards	
3.8	Switches/circuits identified	
3.9	Lock-out procedures/danger tags in place	
3.10	Earth Leakage systems used	
3.11	Start/Stop switches clearly identified	
3.12	Switchboards secured	
4. MobilePlant and Equipment		
4.1	Plant and equipment in good condition	
4.2	Daily safety inspection procedures/checklists	
4.3	Fault reporting/rectification system used	
4.4	Operators trained and licensed	
4.5	Warning and instructions delayed	
4.6	Warning lights operational	
4.7	Reversing alarm operational	
4.8	Satisfactory operating practices	
4.9	Fire extinguisher	

4.10	Tyres satisfactory	
4.11	SWL of lifting or carrying equipment displayed	
5.	Machinery and Workbenches	
5.1	Adequate work space	
5.2	Clean and tidy	
5.3	Free from excess oil and grease	
5.4	Adequately guarded	
5.5	Warnings or instructions displayed	
5.6	Emergency stops appropriately placed and clearly identified	
5.7	Operated safely and correctly	
5.8	Workbenches clear of rubbish	
5.9	Tools in proper place	
5.10	Duckboards or floor mats provided at workbenches	
6.	Hazardous Substances	
6.1	Stored appropriately	
6.2	Containers labelled correctly	
6.3	Adequate ventilation/exhaust systems	
6.4	Protective clothing/equipment available/used	
6.5	Personal hygiene – dermatitis control	
6.6	Waste disposal procedures	
6.7	Material safety data sheets available	
6.8	Chemical handling procedures followed	
6.9	Chemical register developed	
6.10	Appropriate emergency/first aid equipment – shower, eye bath, extinguishers	
6.11	Hazchem signage displayed	
7.	Welding	
7.1	Gas bottles securely fixed to trolley	
7.2	Welding fumes well ventilated	
7.3	Fire extinguisher near work area	
7.4	Only flint guns used to light torch	
7.5	Flash back spark arresters fitted	
7.6	Vision screens used for electric welding	
7.7	LPG Bottles within 10 year stamp	
7.8	PPE provided and worn	
7.9	Hot Work permit system used	
8.	Excavations	
8.1	Shoring in place and in sound condition	
8.2	Excavation well secured	
8.3	Signage displayed	
8.4	Banks battered correctly and spoil away from edge	
8.5	Clear and safe access around excavation	
8.6	Separate access and egress points from excavation	
8.7	WH&S plans and safe work procedure in place	
9.	Prevention of Falls	
9.1	All work platforms have secure handrails, guarding or fence panels	
9.2	Harness and lanyard or belts provided	
9.3	All floor penetrations covered or barricaded	
9.4	Unsafe areas signposted and fenced	
9.5	Safe work procedure in place	
10.	Stairs, Steps and Landings	
10.1	No worn or broken steps	
10.2	Handrails in good repair	
10.3	Clear of obstructions	
10.4	Adequate lighting	
10.5	Emergency lighting	
10.6	Non-slip treatments/treads in good condition	
10.7	Kick plates where required	
10.8	Clear of debris and spills	
10.9	Used correctly	

11.1	Ladders in good condition	
11.2	Ladders not used to support planks for working platform	
11.3	Correct angle to structure 1:4	
11.4	Extended 1.0 metre above top landing	
11.5	Straight or extension ladders securely fixed at top	
11.6	Metal ladders not used near live exposed electrical equipment	
12.	Personal Protection	
12.1	Employees provided with PPE	
12.2	PPE being worn by employees	
12.3	Suncream and sunglasses provided	
12.4	Correct signage at access points	
13.	Manual Handling	
13.1	Mechanical aids provided and used	
13.2	Safe work procedures in place	
13.3	Manual handling risk assessment performed	
13.4	Manual handling controls implemented	
14.	Workplace Ergonomics	
14.1	Workstation and seating design acceptable	
14.2	Ergonomic factors considered in work layout and task design	
14.3	Use of excessive force and repetitive movements minimised	
14.4	Appropriate training provided	
15.	Material Storage	
15.1	Stacks stable	
15.2	Heights correct	
15.3	Sufficient space for moving stock	
15.4	Material stored in racks/bins	
15.5	Shelves free of rubbish	
15.6	Floors around stacks and racks clear	
15.7	Drums checked	
15.8	Pallets in good repair	
15.9	Heavier items stored at waist height	
15.10	No danger of falling objects	
15.11	No sharp edges	
15.12	Safe means of accessing high shelves	
15.13	Racks clear of lights/sprinklers	
16	Confined Spaces	
16.1	Risk assessment undertaken	
16.2	Communication and rescue plan in place	
16.3	Safety equipment in good working condition	
16.4	Suitable training provided to employees	
16.5	Confined Space permit used	
17	Lasers	
17.1	Operator has laser operator licence	
17.2	Signage displayed	
17.3	Laser not used in a manner to endanger other persons	
18	Demolition	
18.1	Risk assessment undertaken in advance	
18.2	Access prevented to demolition area	
18.3	Overhead protection in place	
18.4	Protection of general public	
18.5	WH&S plans and safe work procedure in place	
19	Public Protection	
19.1	Appropriate barricades, fencing, hoarding, gantry secure and in place	
19.2	Signage in place	
19.3	Suitable lighting for public access	
19.4	Footpaths clean and free from debris	
19.5	Dust and noise controls in place	
19.7	Traffic control procedures in place	
19.8	Public complaints actioned	
20	Amenities	

20.1	Washrooms clean	
20.2	Toilets clean	
20.3	Lockers clean	
20.4	Meal rooms lean and tidy	
20.5	Rubbish bins available – covered	
21	First Aid	
21.1	Cabinets and contents clean and orderly	
21.2	Stocks meet requirements	
21.3	First aiders names displayed	
21.4	Meal rooms clean and tidy	
21.5	Qualified first aider(s)	
21.6	Record of treatment and of supplies dispensed	
22	Lighting	
22.1	Adequate and free from glare	
22.2	Lighting clean and efficient	
22.3	Windows clean	
22.4	No flickering or inoperable lights	
22.5	Emergency lighting system	
23	Fire control	
23.1	Extinguishers in place	
23.2	Fire fighting equipment serviced/tagged	
23.3	Appropriate signing of extinguishers	
23.4	Extinguishers appropriate to hazard	
23.5	Emergency signing of extinguishers	
23.6	Emergency exit signage	
23.7	Exit path ways clear of obstruction	
23.8	Alarm/communication system – adequate	
23.9	Smoking/naked flame restrictions observed	
23.10	Minimum quantities of flammables at workstation	
23.11	Flammable storage procedures	
23.12	Emergency personnel identified and trained	
23.13	Emergency procedures documented – issued	
23.14	Emergency telephone numbers displayed	
23.15	Alarms tested	
23.16	Trail evacuations conducted	
23.17	Personnel trained in use of fire fighting equipment	

11 Not Allocated

PART 3. MILL HAZARDS

12 Plant

12.1 Introduction

Mills have an obligation to eliminate or minimise the risks associated with plant used as part of the milling operations. The risks can be managed by:

- Using the risk management approach discussed in section 6 of this code.
- Providing training for all new and existing workers who:
 - operate, maintain, inspect or audit plant;
 - train others to operate, maintain, inspect or audit plant; and
 - when new plant is introduced to a mill workplace.
- Ensuring the competency of the people operating or maintaining the plant.
- Maintaining records.
- Consulting with workers about:
 - hazards and risks associated with plant;
 - their training needs; and
 - any proposed changes to plant.
- Registering the plant and the design where appropriate.

12.2 Sugar milling plant

Sugar mills operate fixed plant ranging from boilers and turbo alternators to workshop equipment such as cut off wheels and bench grinders and mobile plant including locomotives, end loaders, forklifts, bobcats and cranes.

Registrable plant as listed in schedule 3 of the *Regulation* (see section 28 of this Code) that are likely to be used at a mill include:

- cooling towers;
- boilers;
- cranes with a safe working load (SWL) greater than 5 t and truck mounted cranes with a moment capacity greater than 10 m.t;
- unfired pressure vessels such as evaporators and vacuum pans; and
- vehicle hoists.

Plant designs which require registration under schedule 4 of the *Regulation* include:

- cranes with a SWL greater than 5t;
- vehicle hoists;
- boilers; and
- evaporators and vacuum pans.

Particular plant with significant risks that do not require registration or where operation is not classified as a prescribed occupation include:

- locomotives;
- workshop equipment such as grinders, drilling machines and lathes; and
- lab equipment such as cutter grinders and disintegrators.

In some instances mill management will issue an “Authority to Operate” for various forms of fixed and mobile plant where there is no certificate issued by the regulatory authority. Examples could include an authority to drive a locomotive or to use an explosive powered tool.

There is an obligation on the management to ensure that a holder of a certificate has been properly trained and is competent to operate the fixed/mobile plant.

12.3 Risk management

The ways injury can occur include:

- Being struck by machinery, equipment or their by-products. Examples include metal fragments, conveyor belts, mobile plant and cane bins.
- Being caught between moving parts. Examples include being caught between, on or in moving cane bins, mill rolls, sugar dryer and belt and chain drive systems.

Methods to reduce or eliminate the risks associated with plant include:

- guarding to prevent the operator coming into contact with moving parts;
- start/stop switches clearly marked and within easy reach of operators;
- use of specific signage;
- adequate work space around machines;
- specified areas for waste offcuts;
- training for operators;
- regular maintenance;
- good housekeeping standards;
- provision and use of appropriate PPE; and
- ensuring hair, clothing or jewellery cannot get caught.

12.4 Records

Where practicable, management should keep records on:

- the item of plant, identification number and design drawings and calculations;
- details of maintenance, major repairs and modifications;
- audits and inspections;
- results of risk assessments;
- information, instruction and training given to workers about using the plant and the associated risks;
- safe work procedures to be followed where the plant is used.

12.5 Recommendations

- all persons at the workplace (including persons in supervisory positions and contractors) are to follow the safe work procedures for plant as identified in specific equipment operating instructions and established on-site practices;
- create and maintain a system of records to an appropriate standard in relation to plant, training and persons authorised to use such plant.

12.6 References

Workplace Health and Safety (Plant) Advisory Standard.

Workplace Health and Safety Regulation, Parts 2 and 3, and Schedules 3 and 4.

Workplace Health and Safety. *Risk management workbook – Manufacturing industry.*

13 Plant controls

13.1 Machine guarding

Where there is a risk of exposure to hazardous plant parts during access for operation, examination, lubrication, adjustment or maintenance, that risk must be eliminated or, where it cannot be eliminated, minimised. An important engineering option that is often used to minimise the risk is machine guarding.

Hazardous plant locations include:

- 'drawing in' points
- shear points
- impact points
- cutting areas
- entanglement areas
- stabbing points
- abrasion areas
- flying particles
- protrusions that could cause injury

Hazards that may be controlled by guarding include:

- contact or entanglement with machinery
- trapped between plant and material or fixed structure
- contact with material in motion
- being struck by ejected parts of plant
- being struck by material ejected from plant
- release of potential energy.

Potentially hazardous items of plant that are likely to be found at a mill workplace and can be a risk to anyone near the plant include:

- abrasive wheels
- belts and pulleys
- cane bins
- chain and sprocket gears and drives
- circular saws
- conveyors (belt, screw and bucket)
- cut-off saws
- cutter grinders
- disintegrators
- drills and chucks
- fans
- flywheels and gear wheels
- guillotines blades
- hydraulic presses
- milling cutters
- milling train carriers and rolls
- shafts and spindles
- slides and cams
- tools and dies

When assessing the risks, previous incident reports and investigations are an important source of information and should be reviewed. All mills use similar plant. Other mills can also provide useful information and ideas about their methods for eliminating risks.

Guards do not eliminate the hazard. The primary function of a guard is to provide a physical barrier that prevents access to the hazardous parts of a plant item.

The types of guard and their suitability for particular applications include:

- Fixed guards - They have no moving parts and offer protection only when properly fixed in position. Where necessary for access, fixed guards should be easy to remove and replace but only be able to be opened or removed with a tool.
- Interlocking guards – These are moveable, with the moving part interconnected with a control system. Interconnections are usually either electrical, mechanical, hydraulic or pneumatic. The interlock prevents the machinery from operating unless the guard is closed.
- Automatic guards – These automatically move into position as the machine, or cycle is started. These are only suitable on slow moving machines.
- Distance guards – These prevent access to hazardous areas through a barrier or fence.
- Trip guards (presence sensing devices) – These stop a machine when a person gets into a position where they are liable to be injured. A photo-electric curtain is an example of this type of guard.

13.1.1 Recommendations

Where a hazard is identified, an assessment of the risks associated with the hazard must be made. Management should conduct a separate risk assessment for each item of plant and any associated system of work used with that machine. The risk assessment should prioritise the risks so that effort can be directed to eliminating or controlling risks that have a high potential to cause harm.

Where access is not necessary for operation, inspection, maintenance or cleaning, fixed guards should be used.

Where a risk assessment indicates a significant risk to workers required to work in close proximity to or interact with plant such as power presses, interlocking guarding should be fitted that would prevent starting or operating the machine if the guard is removed. The system should be designed so that it is difficult to tamper with or bypass the interlock.

Interlocks should be fitted to all items of plant that may present a hazard if removed or changed (e.g. openings on tanks under high pressure or high temperature, exposed blades on disintegrators or a cutter grinder). Such interlocks should prevent the plant from operating whenever the cover, door, lid, inspection hatch etc is removed or opened.

Where guarding is considered insufficient or easy to tamper with, the erection of barriers or fences should be considered. If an interlock system is malfunctioning and there is a need to operate the plant, a risk assessment may indicate that a barrier or fence may be a suitable short term alternative.

If appropriate, presence sensing devices may be fitted to prevent the plant from starting or operating.

Safe work procedures should be prepared, issued and signed off when access to hazardous parts of plant is required. The procedures should identify the circumstances where access to guarded parts is safe. This will prevent the need to tamper with guarding or interlocks. During the period when a guard is removed to enable access, appropriate lockout and tagout procedures must be used.

There is numerous plant that is remotely started and/or operated. The risks associated with this plant should be assessed and appropriate controls implemented. Controls may include:

- signposting
- flashing lights timed to operate prior to the plant activation;
- presence sensing devices;
- barriers or guards;
- audible alarms; and
- local isolation switches.

Machine guarding and interlocks should be inspected and maintained at regular intervals. Records of inspection and maintenance should be kept.

Elimination of a hazard should be considered when designing new plant or when replacing or modifying existing plant.

13.2 Isolation of equipment

The aim of isolation is to eliminate or minimise the risks associated with plant whenever work involving removal, break-in, replacement, repair or other similar activity is performed in order to prevent injury to workers and others involved with the activities.

Hazards can include:

- hazardous substances (eg. caustic soda, milk of lime);
- hot materials (eg, steam, hot juice, massachusetts, other process streams)
- energy sources (eg. electrical, mechanical, heat, pneumatic, hydraulic); and
- hazards identified in section 13.1.

Isolation procedures may be required:

- when a plant is suspected of being in a hazardous condition (malfunctioning, broken, damaged etc.) and inspection and repair/replacement are required;
- following an incident when it is necessary to isolate plant;
- for routine inspection;
- for any entry into plant by workers; and
- when it is desirable to prevent the use, including unlawful use, of plant.

Examples where isolation procedures may be required include:

- replace or repair valves, pumps or pipe sections;
- replace fugitive screens; and
- shredder hammer replacement.
-

13.2.1 Recommendations

Before any work involving removal or repair of plant, breaking into lines and systems or any other task that may involve exposure of workers to hazards, an assessment of the risks should be conducted.

Where significant risks have been identified, safe work procedures should be prepared with specific details for:

- Identified hazards such as energy sources, movement by other forces such as gravity, moving loads, steam;
- type of lockout and other isolation devices to be used e.g. locks (keys, multilock, codelock, time delay lock), danger tags, out of service tags, mechanical (bars, clamps, chains, removal of component), valve bleeding and other control measures. Stored energy itself should not be used to effect isolation (e.g. valves should fail safe, use of manual isolation valves where possible);
- application and removal of isolation and lockout devices (test-run machines before isolation);
- identification of lockout points and zones of isolation systems;
- dual drives;
- nomination of trained and authorised personnel for isolation procedures for each work area;
- authority for over-riding any interlocks already in place;
- regular testing of isolation systems and circuits;
- electrical items to be isolated from all sources of electrical power prior to the commencement of any work on the equipment.

Before commencing work on plant, all isolations, lock outs and testing should be performed by competent persons.

Where isolation procedures are implemented often e.g. for routine replacement or maintenance, for particular plant, standard work procedures could be developed and used as required.

Training in relation to isolation procedures should be conducted, as required, to ensure competency. Isolation procedures should be periodically reviewed or when plant is modified or replaced or new plant is introduced to a system. Records of training and procedure reviews should be kept.

13.3 Shut-down and Start-Up

This section is concerned with issues associated with the shut-down and start-up of plant items for maintenance or repairs. The aim is to ensure that the shut-down and start-up is carried out in a way that does not present a risk to the health and safety of mill workers or others.

13.3.1 Routine shut-downs

Routine shut-downs and start-ups are usually scheduled and planned so that the appropriate preparation can be made and precautions taken to minimise risk of injury to workers and damage to mill equipment. Examples of routine shut-downs include, but not restricted to:

Routine planned maintenance
Wet weather shut-down

Maintenance day activities
Weekend shut-down if 5/6 day cycle

13.3.2 Unscheduled shut-downs

Unscheduled shut-downs are, as the name implies, usually require an emergency stop for immediate repair. They occur at any time while the factory is in normal production. Unscheduled shut-downs are a major cause of lost processing time. The pressure to minimise the lost time can increase the risk of injury to workers engaged in the emergency repairs.

There are two types of unscheduled shut-downs:

Type 1 - those that can occur from time to time as a consequence of choked feed chutes, motors tripped on overload, etc.; and

Type 2 - those that are not expected to occur and are the result of a failure, e.g.

- Water tubes failing in a boiler
- Ruptured steam hot juice pipes
- Steam driven plant failure
- Motors or pumps failing
- Hydraulic driven plant failures
- Electrically driven plant failures

13.3.3 Recommendations

Routine shut-downs and start-ups.

Routine shut-downs and the subsequent start-ups should be documented in standard work procedures. These procedures can be either paper based as in a folder system or on-line and printable from a maintenance management system.

Where modifications are planned as part of a scheduled shut-down, safe work procedures are needed to ensure the appropriate person is fully aware of the modifications to be undertaken, the safe work procedures to be used. The operators should be instructed in any new procedures needed to operate and/or maintain the modified equipment. Each completed step should be signed off by the supervisor.

Unscheduled shut-downs.

Type 1. Safe work procedures should be developed and documented for use as required. A risk assessment of the likely hazards should be used to select appropriate control measures to be included in the safe work procedure.

Type 2. For unscheduled and emergency shut-downs and start-ups of this type, the supervisor and/or operator should conduct a risk assessment and take appropriate actions to minimise risks of injury to workers. Where appropriate, the supervisor should issue safe work procedures and a safe work permit for the repair of the

particular plant, and include all the necessary precautions and hazard control measures arising from the risk assessment.

A standard checklist would assist when conducting the risk assessment and formulating the work procedures.

Following an emergency shut-down, if standard work procedures exist for the plant requiring repair, then these should apply. Where no standard work procedures exist for the repair of the plant and significant risks are identified, then safe work procedures should be developed and implemented.

The process should include an appropriate safety inspection prior to start-up, to ensure that any incomplete work or hazards, resulting from the shut-down, are identified and risks eliminated or emergency shutdown minimised. The supervisor and/or operators/responsible person should sign off on completion.

Management should ensure that all workers involved in shut-down and start-up activities are trained and competent to perform their respective duties.

13.4 References

Division of Workplace Health and Safety (1996). *A guide to practical machine guarding*. Workplace Health and Safety (Plant) Advisory Standard.
Standards Australia (1996). *AS 4024.1 Safeguarding of machinery - General Principles*.

14 Safe work permits

This section covers the requirements associated with the safe work permit system including:

- the authority to issue safe work permits;
- the situations where a permit is required;
- things to be considered prior to the issue of a permit;
- the conduct of the work in accordance with the permit; and
- the closure of the permit.

The aim is to ensure that no workers are exposed to significant risks during the performance of work activities where the risks exist.

Examples where a safe work permit would be required include:

- entry to a confined space;
- hot work in or on confined spaces;
- working at heights; and
- hot work.

14.1 Recommendations

Before a safe work permit is issued, a risk assessment must be conducted and documented on the permit.

Each mill should develop a register of tasks requiring a safe work permit.

Any task on the register or other tasks considered at the time to pose a significant risk, should not be performed without a safe work permit being issued.

The issuer of the work permit shall be properly trained in hazard identification, risk assessment and risk control techniques. Their responsibilities and authority should be clearly defined and training reviewed and documented periodically.

Before issuing a safe work permit, the issuer and recipient should consider all potential hazards such as material hazards, pressure, temperature, fumes, electrical power, mechanical energy, hazardous areas, height, radioactive sources, explosive materials, restricted space or field vision, and others.

The work permit shall clearly specify the precautions and risk control measures which need to be employed, such as:

- isolation;
- decontamination;
- working in confined spaces;
- hot work;
- working at heights;
- excavation and building work;
- work on high voltage equipment;
- personal protective equipment;
- provision to notify relevant persons when work commences and when work is completed; and
- other special precautions.

In addition, the issuer of the safe work permit should ensure that the recipient(s) are competent to perform the required tasks.

The issuer should explain the hazards and the control measures to the recipients, prior to the commencement of the work and ensure that the potential risks, control measures to be used, and the safe work procedures are all thoroughly understood by the recipients. The recipients should acknowledge their understanding of the details of the safe work permit in writing before work commences.

Once a work permit has been issued, the work should be carried out as specified in the safe work permit. At completion, the permit should be returned to the issuer and closed.

14.2 Entry into confined spaces

This section covers the requirements associated with entering and performing work by workers and others in confined spaces that may include depending on circumstances and plant design:

- Air conditioning ducts
- bagasse bins
- boilers
- clarifiers
- filter drums
- pans and evaporators
- pipes
- pits
- sugar silos
- trenches
- sugar bins
- sugar dryers
- tanks

This section addresses the assessment of hazards, authorisation for entry, preparation for entry, entry into the confined space, observer's duties, work in the confined space, training, rescue, first aid and the isolation of confined spaces.

A safe work permit system shall be used to ensure that all risks associated with an entry into a confined space are assessed and those risks are minimised or, where possible, eliminated with appropriate control measures. The issuer of safe work permits must be trained in confined space entry procedures and risk assessment techniques.

Some of the hazards associated with confined spaces include:

- oxygen deficient or enriched atmosphere
- flammable atmosphere
- toxic atmosphere
- engulfment
- electric shock
- temperature extremes
- access and egress
- external hazards that may affect those in the confined space
- residual hazardous substances
- surfaces
- visibility
- noise
- psychological factors
- mechanical equipment

14.2.1 Recommendations

Procedures are required that address all the hazards likely to be encountered before a safe work permit is completed and person(s) are permitted to enter the confined space. Matters to be considered include:

- identification of the authorised person;
- risk assessment;
- isolation procedures;
- atmospheric testing and the need for air purging;
- portable electrical equipment;
- lighting and ventilation;
- access and egress;
- requirement for a stand-by person and identification;
- emergency equipment, rescue procedures and first aid;
- signs and barriers to prevent unauthorised access;
- education and training of all persons working in or involved with confined space entry;
- the work to be performed in the confined space;
- work being performed outside the confined space;
- whether other hazardous conditions apply, e.g. hot work, working at heights, excavation; and
- potential for hazardous conditions to result from the work activities.

All existing confined spaces and the hazards associated with working in those confined spaces shall be identified at each workplace. A confined space can also be created during the manufacture of plant, equipment and or machinery, e.g., building a tank.

No safe work permit shall be issued until all controls are implemented and the persons entering the confined space are briefed about the conditions of entry.

The work in the confined space is to be carried out as specified in the permit and all the required controls and procedures shall be followed.

If the work activities are likely to generate harmful fumes or deplete oxygen levels then it will be necessary to implement controls that will minimise the risks associated with these hazards.

The name of each person entering a confined space shall be recorded and a system implemented to account for each person involved using appropriate procedures to control entry/egress.

A stand-by person must be provided if a risk assessment indicates a risk to health and safety, such as an unsafe atmosphere or engulfment.

The stand-by person shall follow the specified duties and not leave the position while any person remains in the confined space. In the event of an injury or collapse of the person in the confined space, the stand-by person's primary role is to summon help and if possible, provide assistance, first aid, resuscitation, etc. The observer will not enter the confined space until it is deemed to be safe by a qualified, authorised person.

At the completion of the work, all persons involved in the work shall be confirmed as having left the confined space, the confined space shall be closed, the relevant persons notified and the permit signed off and returned to the issuer and closed.

An example of a safe work procedure to plug a boiler tube is included as Appendix 14.A.

14.3 Working at Heights

This section covers the requirements associated with working at heights, including high plant structures, scaffolding and platforms, and work on roofs. It also covers the use of ladders, the erection and dismantling of scaffolding.

The aim is to ensure that work at heights is carried out safely and that persons performing the work do not endanger themselves or others who may be exposed to falling objects at heights or on the ground.

14.3.1 Recommendations

Any work on roofs or other high risk places (e.g. scaffolding, high walkways, etc.) should be subject to a safe work permit. The permit issuer and recipient should consider such risks as the fall of people, and the trajectory of falling objects (materials, tools, etc.) which may endanger persons below.

Edge protection and/or fall arrestors should be provided. Training with this equipment is essential and should be periodically reviewed and documented.

Fragile roofs should be sign-posted and special means such as crawl-boards should be used.

A system of work to ensure scaffolding is safe to use and/or out of service is to be documented and implemented.

Work using scaffolding shall only be performed when erection of the scaffolding is complete, unless the work involves erecting or dismantling the scaffolding.

When persons below may be exposed to risks associated with falling objects, fencing-off the area immediately below the work and the posting of warning signs, should be considered.

Portable ladders shall be selected, used and maintained in accordance with AS 1892. Aluminium and other metal ladders shall not be used for electrical work.

14.4 Hot work

This section covers the control of hot work in hazardous areas, and addresses such areas as work permits, training of personnel and testing for flammable gases.

The aim is to ensure any risks associated with hot work are properly assessed prior to commencing work, so that the work may be carried out safely and not produce sources of ignition in areas where flammable gases or dusts may be present.

14.4.1 Recommendations

A safe work permit should be issued prior to the commencement of any hot work. Persons authorised to issue safe work permits should be trained in the identification of specific hot work hazards, risk assessment and the selection of appropriate control measures to minimise or eliminate the risks.

Before a hot work permit is issued, the issuer and recipient must assess the risks and select suitable control measures where necessary. Things to consider may include:

- plant isolation;
- residues of flammable materials;
- testing for flammable and fermentation gases (e.g. methane)
- special precautions;
- personal protective equipment ;
- suitable tools, equipment and materials to be used for the work; and
- emergency procedures.

If flammable materials are present, a suitably trained and qualified observer should be in attendance for the duration of the hot work.

Persons carrying out hot work should be qualified and trained for the task (e.g. welding, use of fire extinguishers, etc.). This training should be documented.

Where flammable gases may be present (e.g. in a hazardous area) testing of the atmosphere prior to the work and at regular intervals shall be carried out.

14.5 Construction and Demolition

This section considers the construction and/or demolition of structures. A principal contractor (PC) shall be appointed for any construction workplace.

The aim is to ensure that the construction and demolition of structures is carried out in a way to ensure freedom from risk of death, injury or illness .created from any activities associated with the construction or demolition.

14.5.1 Recommendations

Before commencing construction or demolition work, a work plan¹ shall be prepared. The plan shall include the method of construction or demolition and measures to ensure the health and safety of workers and others. Special reference should be made to specified work i.e., working at heights, excavation and/or asbestos work. Demolition work shall be carried out under the control of a certificated person.

¹ Templates for WH & S Plans for Principal Contractors, Sub-Contractors, Trenching, Bricklaying, Demolishing, Form-Workers and Civil Construction are available from Div Workplace Health and Safety.

Workers involved in construction and demolition projects should be trained and the training documented.

During construction and demolition, relevant buildings or equipment are to be sign-posted and access to them shall be restricted or controlled to prevent exposure of workers to hazards.

All requirements, in any of the other procedures, applicable to construction and demolition activities (e.g. work permits, personal protective equipment, waste treatment and disposal, etc.), are to be followed.

Permanent isolation of all equipment shall be effected by disconnecting all energy supplies at the source.

14.6 Excavation and concealed services

This section covers excavation work and building work, particularly work which involves breaking into walls, and other work where unseen pipes, electrical cables or other hazards may be present or where cave-ins or collapse may occur. This section aims to ensure that hazards such as hidden cables, pipes, etc. are avoided and cave-ins and collapses are avoided during the excavation and/or building work.

14.6.1 Recommendations

A safe work permit should be issued prior to the commencement of any excavation or building work involving break-in.

Before a safe work permit for such work is issued all foreseeable hazards shall be assessed and the appropriate control measures selected. This shall include consulting the relevant up-to-date documentation and drawings, identifying the location and depth of buried or hidden services, isolating them or protecting them if isolation is not practical. Structural aspects of the buildings must be assessed.

A safe work permit and a excavation/trenching checklist shall be completed for each job. The Supervisor, Coordinator and/or Team Leader is to ensure the permit is completed by a competent person who has been trained in excavation/trenching work. See figures 15.2 and 15.3 for examples of a *Risk Assessment – Excavation and/or Trenching Work* and *Excavation & Trenching Work Checklist* respectively.

Prior to excavation/trenching starting

- all underground services have to be located, marked and precautions taken to avoid them
- workplace secured from unauthorised access
- shoring requirements assessed by an experienced person
- adequate supply of shoring on site
- if possibility of flooding, a pump is available
- adequate ventilation is required for equipment to be used in the excavation/trench

If the excavation/trenching requires support

- a safe method is to be used for installing and removing the timbering eg one that does not rely on people working within an unsupported trench
- if battering/shoring is required the battering/shoring must be sufficient to prevent collapse - Shoring shall be erected and maintained where, having regard to the nature of the soil and the slope of the side of the trench or excavation and other circumstances, a fall or dislodgment of earth or other material is likely to occur so as to bury or trap a workman or other person or to strike a workmen or other person from a height of more than 1.5 metres.

During the excavation/trenching

- adequate barriers/tags are erected around the trench and if required warning lights, signs, fences
- adequate access into the trench is provided - Where, in a trench or excavation, ladders are used as a means of access or egress such ladders shall extend from the bottom of the trench or excavation to at least one (1) metre above the top.
- during the course of trenching/excavation work a competent person shall examine the shoring once each day before work commences and so often as may be necessary to determine whether the shoring is adequate and secure.

- a person shall not enter a excavation/trench or perform any work therein unless there is at least one (1) other person engaged in the immediate vicinity of such trench or excavation to render assistance in the case of emergency
- trenching does not undermine adjacent structures
- spoil heaps, stacked materials etc are kept at least 600mm away from the edge of the trench
- controls in place if vibration near the trench eg heavy plant or machines, vehicular traffic
- motorised equipment is not used in the trench

14.7 References

Standards Australia (1995). *AS 2865 Safe working in a confined space*.
Standards Australia. *AS 1892 Portable ladders*.
Workplace Health and Safety Regulation 1997 Part 15 – Confined Spaces.
Workplace Health and Safety (Work on roofs) Advisory Standard.
Workplace Health and Safety (Falls from heights) Advisory Standard.
Workplace Health and Safety (Falling objects) Advisory Standard.
Workplace Health and Safety (Scaffolding) Advisory Standard.
Workplace Health and Safety (Formwork) Advisory Standard.
Workplace Health and Safety (Excavation) Advisory Standard.
Workplace Health and Safety Regulation 1997 Parts 6, 8 and 9.
Workplace Health and Safety Guidelines - Underground Services

Figure 14.1 Example: Safe work procedure to plug boiler tubes (page 1 of 3)

SAFE WORK PROCEDURE					
DEPARTMENT: Engineering		SECTION: Boiler Station		CURRENT	PAGE : 1 OF 3
TASK/JOB: Plugging Boiler Tubes					REF:
REASON FOR SWP:		SWP APPROVED BY:		DATE:	
DATE OF REVIEW:		BY WHO:		OUTCOME: REVISE SWP <input type="checkbox"/> REVISE RISK ASSESSMENT <input type="checkbox"/>	
MIII:					
TOOLS REQUIRED	SAFETY EQUIP	PERSONNEL REQ	OTHER JOB REQ	PREPARED BY	
A 32v Lead lights	1 Isolation Equipment	Fitter	This area is deemed a confined space		
B Spanners	2 Gloves	Boiler maker	All confined space entry permit system must be complied with.		
C Drum door spanner	3 Ice water bottle	GMW			
D Man cooler fan	4 Safety pak for fan	Watertender			
E 7 & 4 lb hammer	5 Face shield	Engineer			
F Oxy equipment	6 Overalls/ Long sleeves				
G Welding machine and equipment	or Long sleeve shirt& long pants				
H Flap wheel	8 Site standard PPE				
I Tube plugs	9 Confined space entry permit				
J Door joints (3)	10 Hot work permit				
K Planks (2)	11 Cooling vest				
L Short plank (max 1 M)	12				
M	13				
N	14				
O	15				
P	16				

Figure 14.1 Example: Safe work procedure to plug boiler tubes (page 2 of 3)

SAFE WORK PROCEDURE						
DEPARTMENT: Engineering		SECTION: Boiler Station			CURRENT	PAGE : 2 OF 3
TASK/JOB: Plugging Boiler Tubes				SWP APPROVED BY:		REF:
REASON FOR SWP:		DATE:			ISSUE:	
DATE OF REVIEW: BY WHO:		OUTCOME: REVISE SWP <input type="checkbox"/>		REVISE RISK ASSESSMENT <input type="checkbox"/>		MIll:
SPECIFIC JOB STEPS		TOOLS REQ.	SAFETY EQUIP.	HAZARDS	HAZARD CONTROLS	OTHER INFO
1	Isolate stop valve.		1&8	Steam	Effective isolation	
2	Open front grate and ID damper to cool boiler down.		8			
3	Blow down hot water from boiler until empty.		8			
4	Fill boiler with water from outside storage tanks until leak flows.		8			
5	Remove inspection door to mud drum sluice/ash hoppers.	B	8			
6	All checks for confined space entry to be carried out and entry permit completed.		8&9			
7	If hot work is to be carried out a hot work permit is to be completed.		8&10			
8	Install planks over ash hopper	A&K				
9	Stand on planks , find leak and note position.	A&K	6&8	Hot water squirting out, hot ash, hot sand and loose refractory.	Wait until pressure drops and leak has small flow. Reduce draught from ID fan.	A tube with a large leak can be found from inside the drum by feeling for suction from ID fan.
10	Empty boiler					
11	Isolate (a) boiler feed pumps - steam and electric. (b) feed check valves and aux. valves. (c) team stop valves and by pass valves. (d) Blow down valves. (e) burners (f) other common lines.		1&8	Steam and boiler feed water.	Effective isolation.	Consult with boiler operator.
12	After releasing vacuum to drum by opening pet cocks, open drum doors. (2 top and 1 bottom)	C	2&8	Because of vacuum door tends to suck in.	Keep hands clear of studs when slinging open.	Refer to SWP on opening drum doors

Figure 14.2 Example: Risk assessment form for excavation and/or trenching work

RISK ASSESSMENT FOR EXCAVATION AND/OR TRENCHING WORK

Details of work to be undertaken																
Range of possible work methods which could be used																
Method (a)																
Method (b)																
Method (c)																
Method (d)																
Hazards Present	Is there a Risk								Level of Risk							
	No				Yes				No				Yes			
Work Method	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d
Excavation																
(a) shoring/battering																
(b) Underground services																
(c) Access into trench																
(d) Seepage																
Physical agents																
(a) Thermal extremes																
(b) Noise																
(c) Engulfment																
(d) Moving Equipment																
(e) Introduction of water etc																
(f) Electrocutation																
(g) Explosion of fire																
(h) Manual Handling Hazards																
(i) Slips, trips, falls																
From the above information, which is the best method to use																
Procedure for emergency & rescue																

Figure 14.3 Example: Excavation & Trenching Work Checklist

What area is to be excavated?		
What method is to be used (e.g. Backhoe)			
Proposed depth of excavation/trench			
Is the excavation deeper than 1.5 metres. Trenches deeper than 1.5 metres have extra shoring requirements	Yes <input type="checkbox"/> No <input type="checkbox"/>		
Does the excavation require shoring/battering?	Yes <input type="checkbox"/> No <input type="checkbox"/>		
If shoring required, adequate supply of suitable supporting material delivered to site prior to trenching commencing	Yes <input type="checkbox"/> No <input type="checkbox"/>		
All underground services located, marked and precautions taken to avoid them	Yes <input type="checkbox"/> No <input type="checkbox"/>		
All shoring must be erected by a competent person			
All barricades around excavation/trench must be placed 1 metre from edge. All barricades must be tagged with barricade tag. All materials and equipment must be placed no closer than 600 mm from the side of the excavation.			
Special Precautions required? e.g. Telstra, Plumber, Electrician			
Where applicable – please tick as completed			
Tools & Equipment checked	Yes <input type="checkbox"/> No <input type="checkbox"/>	Isolation procedures applied	Yes <input type="checkbox"/> No <input type="checkbox"/>
Area signposted & barricaded/tagged	Yes <input type="checkbox"/> No <input type="checkbox"/>	Additional permits completed	Yes <input type="checkbox"/> No <input type="checkbox"/>
Fences required	Yes <input type="checkbox"/> No <input type="checkbox"/>	Trenching does not undermine adjacent structures	Yes <input type="checkbox"/> No <input type="checkbox"/>
Warning lights required	Yes <input type="checkbox"/> No <input type="checkbox"/>	Controls for heavy plant operating in adjacent area	Yes <input type="checkbox"/> No <input type="checkbox"/>
Signs required	Yes <input type="checkbox"/> No <input type="checkbox"/>	Others in work area notified	Yes <input type="checkbox"/> No <input type="checkbox"/>
Access into trench required	Yes <input type="checkbox"/> No <input type="checkbox"/>	Emergency Procedures in place	Yes <input type="checkbox"/> No <input type="checkbox"/>
Adequate access into the trench	Yes <input type="checkbox"/> No <input type="checkbox"/>	Ventilation checked	Yes <input type="checkbox"/> No <input type="checkbox"/>
Trenches checked for water seepage	Yes <input type="checkbox"/> No <input type="checkbox"/>	Motorised equipment not in trench	Yes <input type="checkbox"/> No <input type="checkbox"/>
Proceed with caution. If pipes or cables are encountered stop work and ask for further clearances and instructions			
Working in an excavation requires a excavation/trenching permit.			
Return this permit to the Maintenance Planner/Supervisor/Safety Officer			

15 Managing contractors

15.1 Legal Obligations

A mill engaging a contractor to provide services will have an obligation to ensure, so far as is practicable, that there is no risk to health and safety from the carrying out of work by the contractor. A mill must monitor and regulate the conduct of the contractor. **Outsourcing** work to contractors will not remove a mill's obligation to ensure that those who actually perform the work are protected from risks to their health and safety.

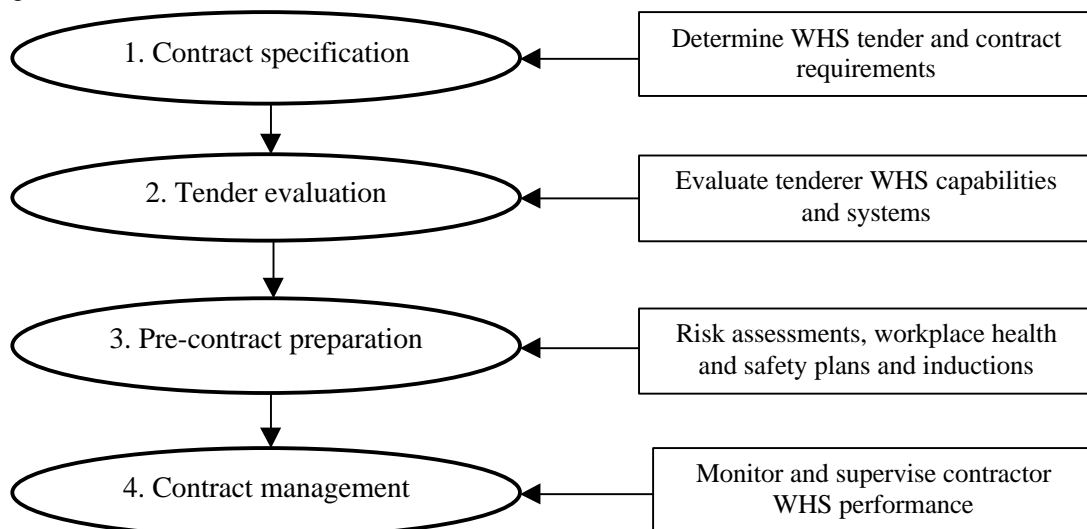
It is important that a mill can demonstrate due diligence in meeting health and safety obligations when engaging contractors. This may be achieved by taking steps that are reasonable in the circumstances to see that a competent contractor with relevant experience is engaged, and:

- the contractor and its employees carry out the work in safe workplaces;
- use proper and safe plant and substances;
- employ systems of work that are safe; and
- there has been adequate instruction, training and supervision.

15.2 Elements of contractor WHS management system

An effective contractor WHS management system must clearly identify the health and safety requirements of the contractor and the mill. All parties must understand their obligations with respect to legal, contractual and technical aspects of the work to be undertaken. This must be supported by appropriate policies and safe work procedures that are integrated with the mill's WHS management system and the day to day business operations.

There are four important stages of the contracting process in which WHS issues must be considered when engaging contractors:



15.3 Classification of contract works

Mills are involved in tendering and managing a very broad range of contracts. These can include long, term service contracts through to quite small contracts for minor maintenance, repair or construction activity. While the obligations on contractors and the mill remain the same irrespective of the size and duration of the contract works, it is important to acknowledge practical issues associated with the engagement of small contractors.

Small contractors typically have less formalised WHS management systems, when compared with larger contracting organisations. Consequently, the mill's WHS contractor management system should be sufficiently flexible to accommodate the different levels of WHS system development. Small contractors may require assistance, particularly at the tendering and pre-contract preparation stages to bring their WHS management up to an acceptable standard.

For major contracts, contractors are expected to demonstrate a higher level of development of their WHS management system. For minor contracts, contractors should demonstrate appropriate health and safety competencies associated with performing the contract tasks.

The approach adopted for minor contracts should focus largely on undertaking risk assessments of the work involved in the contract, ensuring that risks are suitably identified and controlled.

Contract managers at the mill will be generally responsible for classifying the contract as either major or minor. The decision will depend on a range of factors including:

- level of risk associated with the contract;
- duration of the contract;
- complexity of the contract; and
- value of the contract.

The following guidelines are provided to assist with the classification of contracts in the most appropriate manner.

15.3.1 Guidelines for classification of major contracts

When classifying contracts the following issues should be considered:

- (i) Level of risk. Contracts involving high risk activities should be classified as major. The mill has an obligation to insist on more sophisticated management systems when engaging contractors to perform hazardous or specified work. Such work may involve:
 - working in confined spaces;
 - working at heights;
 - demolition work;
 - working with asbestos; and
 - work involving significant hazards to the public.Contractors who undertake this type of work on a regular basis should be familiar with workplace health and safety plans, and other requirements for major contracts.
- (ii) Duration of contract. Contracts which extend beyond 3 years are considered sufficiently large to expect that contractors have formalised WHS management systems which reflect the type of work they are performing. Long term contracts should be classified as major. Although this timeframe is provided as a guide to mills, it may be appropriate to negotiate short and medium term WHS performance objectives of the contractor's management system.
- (iii) Level of Complexity. If a contract involves the use of subcontractors, the mill should be aware that suitable systems of selection and supervision will apply to the subcontractors. Where the contract manager believes the use of subcontract labour is likely, the contract should be classified as major.

- (iv) Value of contract. Although major contracts cannot be classified on cost alone, contracts up to \$42,000 will usually be considered as minor and contracts over \$42,000 considered as major contracts. Building and construction work costing \$42,000 or more is notifiable.

15.3.2 Guidelines for minor contracts

Contractors providing services under this classification must demonstrate an understanding of the health and safety requirements specific to the work to be performed. Furthermore, the minor contract health and safety requirements will require that contractors plan their work, identify the hazards and have in place suitable control measures as part of a risk assessment procedure.

The WHS contractual requirements for minor contracts should focus on the following:

- contractor has a good understanding of the hazards and risks associated with their activities;
- contractor has established systems and procedures for managing the WHS risks although these may not be formalised;
- contractor is licensed for the relevant activities and employees have appropriate competencies and licences required for the contract works;
- plant and equipment is appropriately licensed or registered and maintained/inspected on a regular basis; and
- contractor will undertake a contract specific risk assessment to ensure risks are identified and controlled for the contract works.

The minor contract requirements should not diminish the legal obligations of the contractor and the mill to ensure that the contract works are conducted in a safe manner. Some minor contracts are undertaken without involving a formal tender process. In these circumstances a risk assessment conducted by the contractor will be an important requirement to ensure health and safety risks are addressed prior to the contract commencing.

15.4 Contract specification: Health and safety requirements

By ensuring that health and safety requirements are clearly identified in specification documents, several key messages are conveyed:

- the mill considers WHS as an important priority in the way it conducts its business including contractors engaged by the mill;
- the mill understands and recognises its WHS obligations with regard to contractors and associated systems are developed to manage the process;
- contractors are required to demonstrate that they have an appropriate WHS management system and can verify its implementation in practice; and
- contractors are required to comply with contract specific WHS requirements.

Consultation with the mill's health and safety personnel, management and other relevant staff should be undertaken to ensure that appropriate health and safety issues are identified and considered when preparing specification documents.

15.4.1 Specification Elements

The contract specification should incorporate, as appropriate, the following contract health and safety requirements (refer figure 15.1).

- (i) Comply with health and safety legislation. As a minimum requirement, tenderers must comply with all applicable legislation relating to health and safety
- (ii) Demonstrate evidence of WHS management system. The tenderer's WHS management system must

demonstrate compliance with the employer obligations of the *Act*. The tenderer and its employees are obliged to perform their work using safe plant and substances, employing safe work procedures, and providing adequate instruction, training and supervision.

- (iii) Tenderer WHS management system questionnaire. Tenderers should complete a questionnaire which evaluates the status of their WHS management system. The questionnaire can also be used as a pre-qualification requirement for contractors who are engaged by the mill on a regular basis. Under these circumstances, contractors could complete the questionnaire on an annual basis.
- (iv) Undertake a risk assessment. The tenderer shall identify the hazards associated with the contracted work, assess the risks and develop appropriate control measures. The risk assessment should be undertaken using a standard format and submitted prior to commencing the contract.
- (v) Develop workplace health and safety plans. For major contracts or when required by legislation, the successful tenderer shall prepare and submit a workplace health and safety plan prior to commencing the contract. The plan outlines the structure and means by which health and safety will be managed by the contractor for the term of the contract. The plan will consider the specific WHS issues relevant to the contract works and will document the systems and methods implemented to effectively manage WHS risks.
- (vi) WHS performance reporting. The successful tenderer should provide the mill with regular reports on health and safety performance relating to the contract works or services
- (vii) WHS incident notification. Contractors engaged by the mill should notify the mill of any incident, injury, property or environmental damage associated with the provision of contract works or services
- (viii) Non-compliance. The mill has the right to suspend or terminate the contract works if, in the opinion of the mill, the contractor fails to remedy breaches of health and safety.

15.5 Tender evaluation

The tender evaluation stage allows a mill to verify tenderer compliance with specification requirements, including health and safety aspects. It ensures that the mill establishes that tenderers have adequate WHS management systems and have considered health and safety issues in relation to the contract works. The tender evaluation process typically involves the following tasks:

- review of completed tenderer WHS system questionnaire;
- examination of tenderer's WHS management system documentation, (manuals, procedures, work methods, training/competency records);
- verification of the operation of the tenderer's WHS management system; and
- undertaking interviews with the tenderer to clarify particular issues and areas where more information is required.

Tenderers who cannot demonstrate that they can adequately meet the health and safety requirements of the specification should not be considered in the selection process. Process flow charts for tender evaluation and contractor selection and approval are shown in figures 15.2 and 15.3.

15.6 Pre-contract preparation

The pre-contract preparation stage should be used by the successful tenderer to develop safe work procedures and workplace health and safety plans as appropriate for the contract works. The procedures and plans should only be formulated after detailed risk assessments of the activities to be performed.

This stage should also be used by the mill to ensure that all appropriate WHS systems are established before the contract works are permitted to commence.

The safe work procedures and WHS plans should be reviewed by the mill and, where necessary, returned to the tenderer for reassessment and modification. Once approved by the mill and signed off, the procedures and plans can become the basis of the contractor's work inspections and audits.

If the contractor intends to use sub-contractors, then the sub-contractors need to be identified. The mill should ensure that the contractor establishes procedures to instruct the sub-contractors in the specific WHS plans and safe work procedures to be used for the contract works.

Other activities that should be completed during this stage include:

- Determining the degree of interface needed between the contractor's WHS plans and procedures and the mill's own management system and the level of safety management required for the particular contractor.
- Developing communication mechanisms for the contractor and mill personnel.
- Providing assistance to small contractors to ensure that their WHS management system is satisfactory.
- Providing site specific WHS inductions to the contractor's workers and sub-contractors engaged by the contractor as necessary for the contract works.

15.7 Contract management

The mill has important obligations to monitor and supervise the activities of contractors and sub-contractors with regard to health and safety aspects of their work irrespective of whether contracts are major or minor. Monitoring and supervision by the mill as principal contractor ensures that the contractor's activities are conducted in accordance with:

- health and safety legislation, standards and codes of practice;
- health and safety requirements outlined in contract documents; and
- contract specific requirements as detailed in the WHS plans and procedures prepared by the contractor.

In order to perform this function, contract managers or supervisors should have:

- access to the contract documents and specification;
- good understanding of the health and safety requirements set out in the contract documents;
- access to other documents referred to in the contract, eg. workplace health and safety plans; and
- adequate contract supervision training, and suitable health and safety knowledge and skills relevant to the contract.

Mills should consider providing contract managers with appropriate training in this area, outlining legal obligations and procedures to be adopted when supervising contractors. A contract management flow chart is provided in figure 1.4.

15.7.1 Monitoring and supervision

The extent to which the mill should monitor and supervise contractors will be influenced by several factors, including:

- the level of risk associated with the contractor's activities;
- complexity of the tasks performed by the contractor;
- the control that the mill has over the workplace;
- interaction by the contractor's workers with others (i.e. mill workers, other contractors, public);
- duration of the contract.

Supervision may need to be targeted to specific key elements of a contract, for example:

- *contract start-up*: ensuring that suitable systems and procedures are in place and the workplace is appropriately established;
- *high risk or complex activities*: monitoring conformance with safe work procedures and risk assessment control measures;
- *high level of interaction with other parties*: review of co-ordination and notification systems operating at the workplace;

- *introduction of new plant, equipment or systems of work*: may require separate risk assessment and monitoring of control procedures

Monitoring and supervision of the contractor's activities include:

- Regular review of contractor health and safety documentation;
- Undertaking regular site inspections to monitor compliance with health and safety procedures and plans;
- Providing contractors with advice on unusual or unexpected risks and feedback on areas of non compliance;
- Reviewing, contractor health and safety performance;
- Ensuring that corrective action is taken where non conformance is identified; and
- Incorporating health and safety issues as part of regular contract review meetings.

15.7.2 Workplace inspections

The mill can demonstrate its obligations as the principal contractor in relation to the supervision of contractors and sub-contractors by conducting WHS inspections and monitoring the outcomes of inspections. Inspection programs undertaken by contractors and also by mill representatives are a key element in monitoring the health and safety standards of the contractor's activities. Regular workplace inspections play a significant prevention role by identifying health and safety issues before they result in injury or damage at the workplace.

The contractor has an obligation to conduct workplace inspections on a regular basis. Copies of inspection reports should be available for review when requested by the mill.

Contract managers should check that the contractor has adequately fulfilled its health and safety obligations, as far as they can reasonably establish. Through inspection and monitoring of contractor operations, the contract manager should raise with the contractor any health and safety issues that come to their attention.

Inspections should be conducted in conjunction with a representative of the contractor to enable discussion and resolution of issues as they are identified. The contract manager may seek input from specialist health and safety staff to be available during and after the inspection to give advice on health and safety issues.

The frequency of inspections will depend on the nature and circumstances of each contract. Issues such as the level of risk and extent of control that the mill has over the workplace will influence the frequency of inspections. The contract manager should establish an inspection schedule prior to commencement of the contract.

15.7.3 Contract records

Effective contract management involves adoption of a systematic approach to record keeping during the period of the contract. Relevant health and safety records retained by the mill provide documentary evidence of the mill's due diligence in relation to the health and safety of contractors. These records will be particularly important in situations where the contractor is in breach of health and safety requirements or a serious incident or accident occurs as a result of activities performed by the contractor.

Figure 15.1 Selecting WHS specification clauses process flow chart

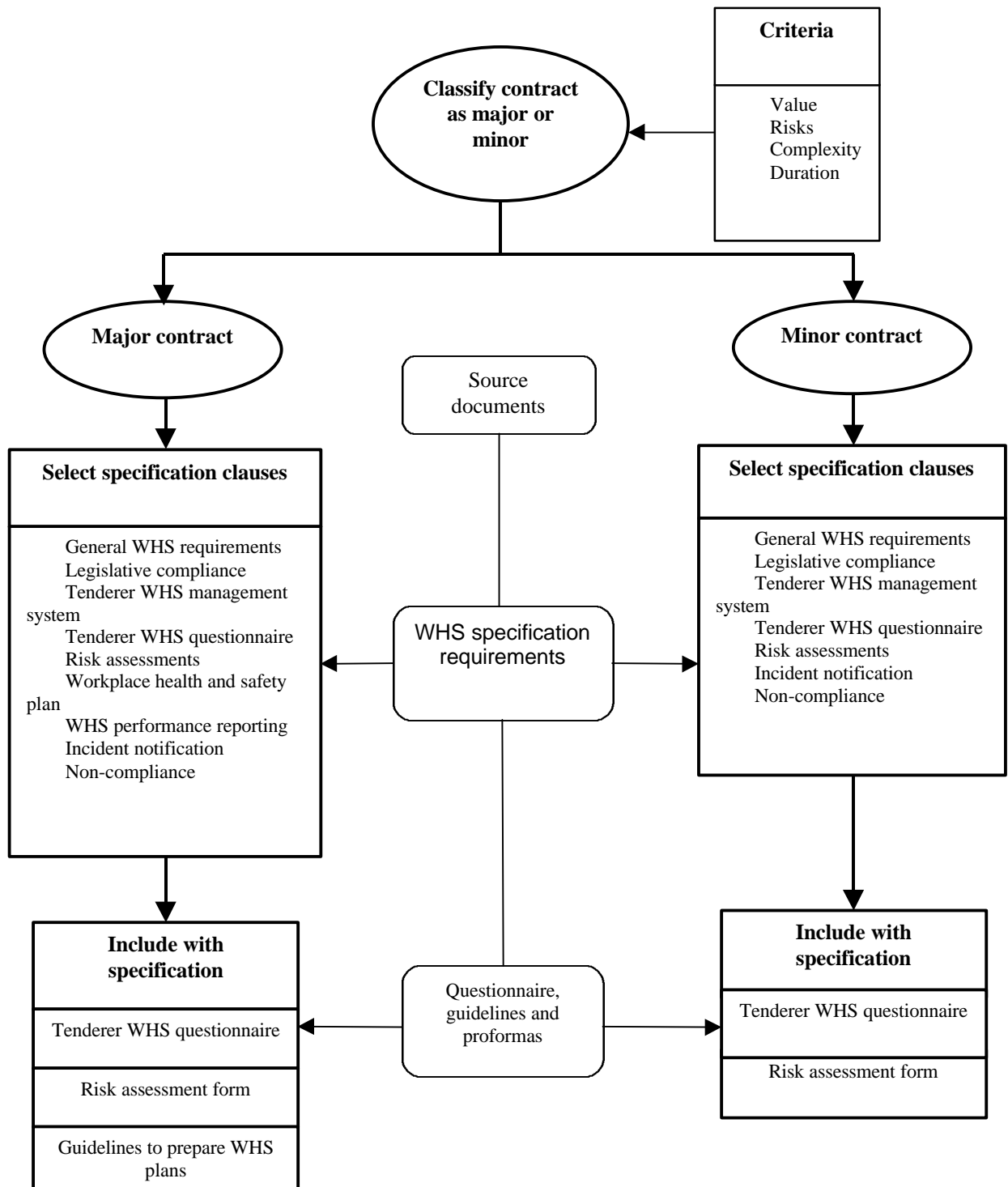


Figure 15.2 Contractor selection and approval process

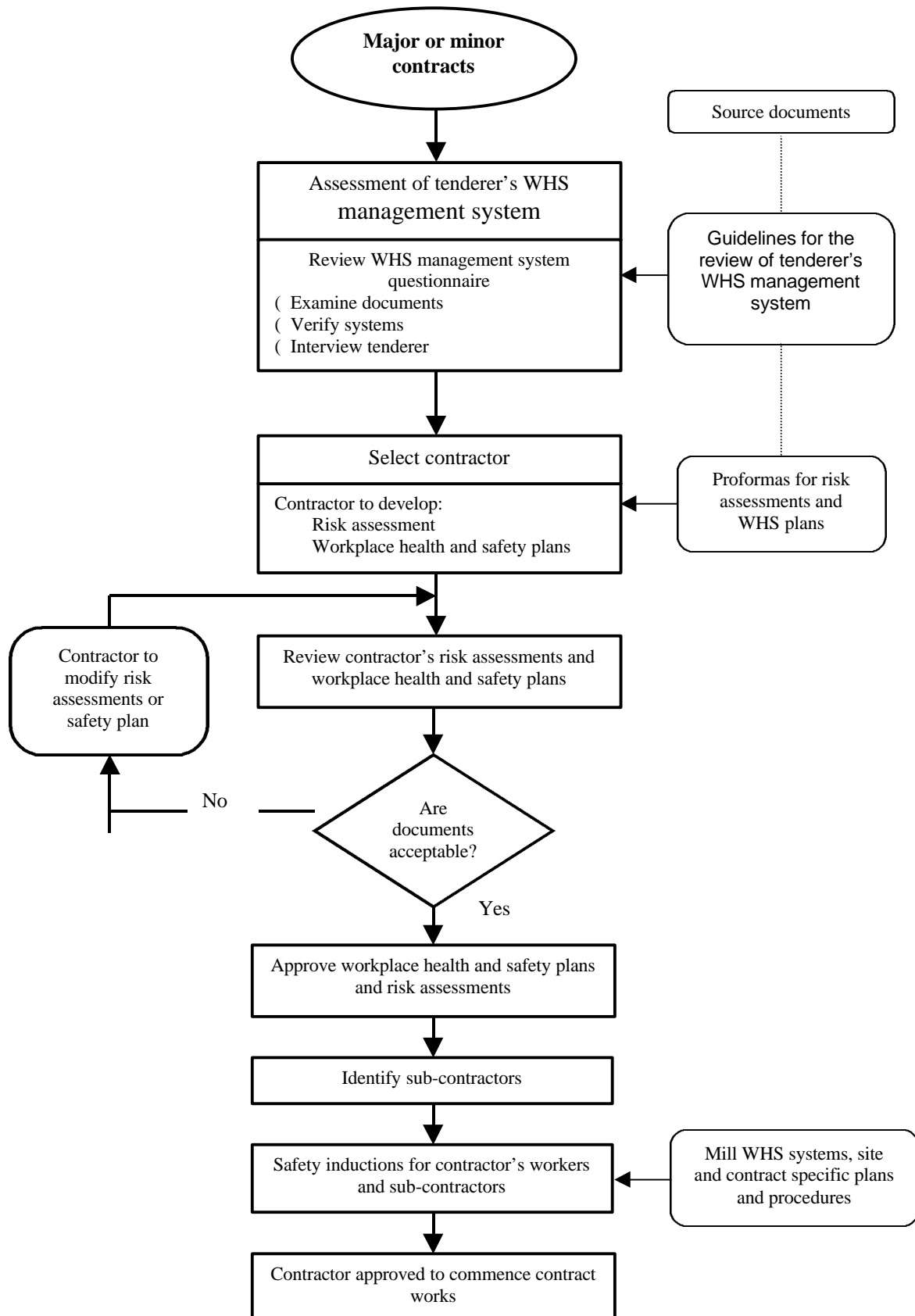
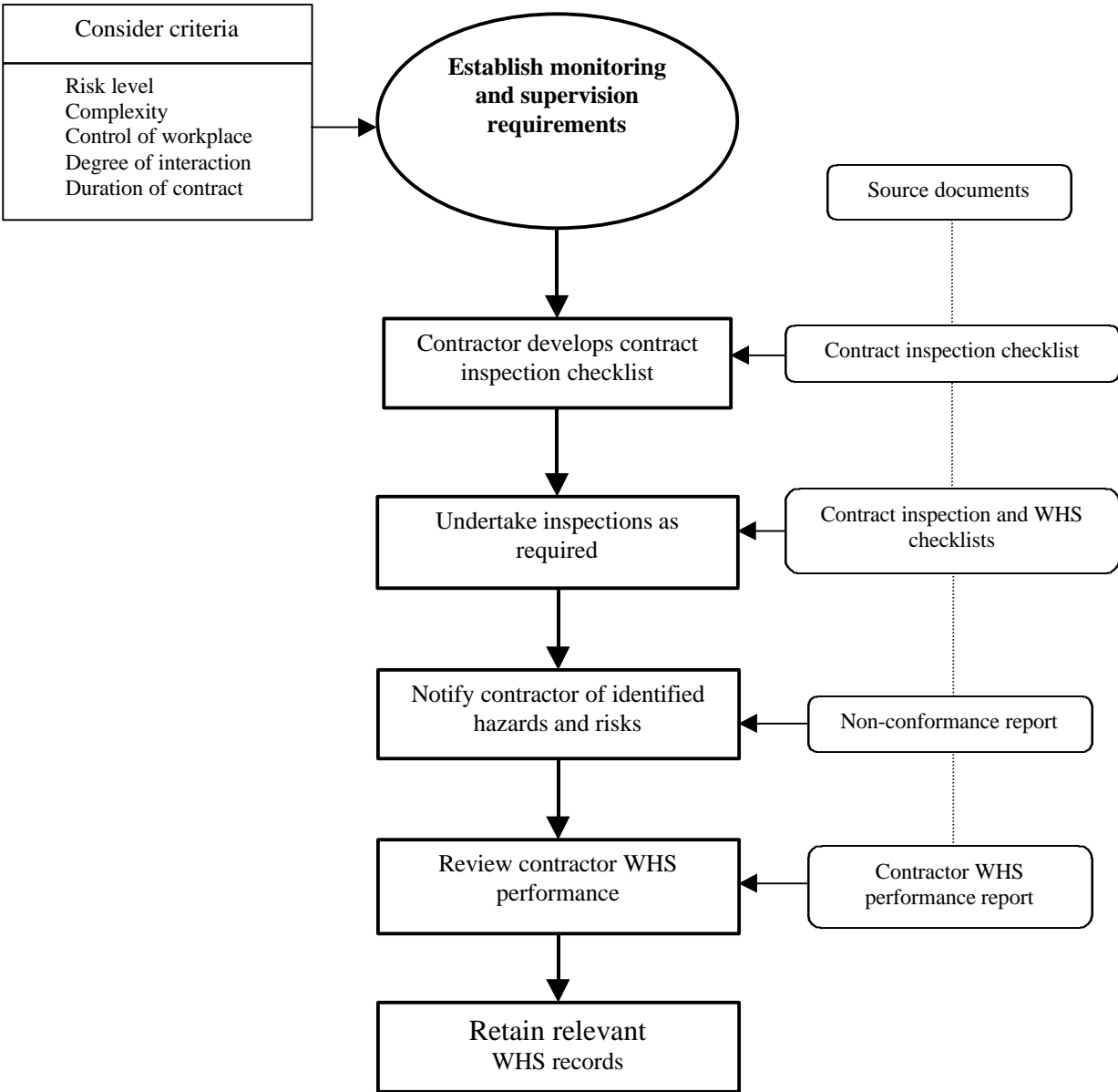


Figure 15.3 Contract management process flow chart



16 Manual Handling

16.1 Manual handling

This section covers the requirements associated with the identification, assessment and control of work tasks involving manual materials handling. These requirements are met by ensuring that (a) a risk assessment is carried out on the manual handling tasks, and (b) controls are put in place to ensure that the tasks are performed in a manner that will prevent back and other musculoskeletal injuries (eg. shoulder, forearm, hand, wrist strains) and other adverse health effects (eg. cardiac risks).

16.1.1 Recommendations

During the design phase of new development projects in mill workplaces, including new fitouts, equipment, and work procedures, assessment of the proposed manual handling tasks should be carried out. Similar assessment should be conducted when any plant or work task is modified.

Regular reviews of existing manual handling tasks should be carried out to identify potential manual handling risks which may arise or which may not be suitably controlled e.g. use of mechanical trolley has reduced the weights and loads carried but created increased risks in pushing sleeper handling. See figure 16.1 for an example of a safe work procedure for handling concrete sleepers.

Incident and performance data and comments from workers should be used to identify manual handling tasks with potential risks requiring further assessment. This data and workers consultation should also be used when determining, implementing and evaluating the success of control measures. For example, supervisor and leading hand diaries and incident records are viewed monthly prior to the staff meeting where the issues are discussed. The issues with workers feedback are then brought to the attention of the health and safety committee and or representative. See figure 16.2 for an example of a safe work procedure for coupling bins where couplings are not aligned.

Manual handling control measures should be selected from a combination of:

- design and redesign of the workplace, workstation, equipment, tools and tasks;
- modification of the methods of work;
- provision of mechanical handling equipment and assistive devices;
- training of workers in methods of work and preferred manual handling techniques;
- consideration of staff rotation, hours of work and other administrative controls.

All workers who carry out manual handling tasks, should be adequately trained in manual handling techniques to perform the task safely. Training should not be conducted in isolation as the only control for manual handling risks. A combination of controls should be selected with job design and redesign as the preferred control approach. A record of the training should be kept.

Where assessment and control decisions require more in depth knowledge, assistance can be obtained from a suitably qualified health and safety professional with skills in ergonomics and human factors eg. ergonomist, occupational therapist, physiotherapist, design engineer.

16.2 References

Workplace Health and Safety (Manual Handling) Advisory Standard, 1991
Workplace Health and Safety (Manual Handling in the Building Industry) Advisory Standard, 1991
Workplace Health and Safety (Work Involving Repetition, Force or Awkward Postures) Advisory Standard, 1996.

Figure 16.1 Example: Safe work procedure for lifting concrete sleepers

SAFE WORK PRACTICE						
DEPARTMENT: Civil Engineers		SECTION: Cane tpt		CURRENT	PAGE 1 OF 1	
TASK/JOB: Laying Concrete Sleepers					REF:	
REASON FOR SWP: Team Request			SWP APPROVED BY:		DATE:	
DATE OF REVIEW:		BY WHO:	OUTCOME: REVISE SWP <input type="checkbox"/>	REVISE RISK ASSESSMENT <input type="checkbox"/>	MILL	
TOOLS REQUIRED		SAFETY EQUIP		PERSONNEL REQ	OTHER JOB REQ	PREPARED BY
A	Sleeper Tape	1	Safety helmets	Six men	Trenches to be a minimum of 2.4m wide	
B	Sleeper Hooks	2	Safety glasses			
C	4lb Hammer	3	Gloves			
D	Tape Pins	4	Field safety glasses			
E	Tape measure or Measuring Wheel	5				
F	Crane & truck	6				
SPECIFIC JOB STEPS			TOOLS REQ.	SAFETY EQUIP.	HAZARDS	HAZARD CONTROLS
1	Unload trucks , first bundle 9.15M from start and the rest at 18.3M centers.		F&E	1,2or 4	Sleeper could slip from bundle	Stand clear
2	Lay out sleeper tape		A,C&D	2 or 4		
3	Lay out sleepers		B	2 or 4 & 3	Uneven ground	Plan job to have trenches 2,4 m wide
3a	Put hooks in matching holes		B	2 or 4 & 3	Bundles too high	high
					Electrical sleepers (CT 108)	Use correct hooks
3b	Lift sleepers together		B	2 or 4 & 3		Observe general manual handling precautions
3c	Place sleepers on tape mark		B	2 or 4 & 3	Walking backwards	Walk facing the same direction
					Looking for the mark	Tape should be marked on both sides

Figure 16.2 Example: Coupling loco-bin or bin-bin where couplings are not aligned.

SAFE WORK PROCEDURE						
DEPARTMENT: Cane Supply and Transport.		SECTION: Locos		CURRENT		PAGE 1 OF 1
TASK/JOB: Safe method for coupling loco to bin / bin to bin where couplings are not aligned.						
REASON FOR SWP: Injury experience.			SWP APPROVED BY:		DATE:	ISSUE:
DATE OF REVIEW:		BY WHO:		OUTCOME:	REVISE SWP <input type="checkbox"/>	REVISE RISK ASSESSMENT <input type="checkbox"/>
TOOLS REQUIRED		SAFETY EQUIP		PERSONNEL REQ	OTHER JOB REQ	PREPARED BY
A	Chain with a hook on both ends.	1	Site standard PPE.	Loco driver		
B		2		Loco drivers assistant.		
C		3				
D		4				
SPECIFIC JOB STEPS		TOOLS REQ.	SAFETY EQUIP.	HAZARDS	HAZARD CONTROLS	OTHER INFO
1 If the couplings can not be aligned without the loco driver's assistant between the loco to bin or bin to bin space - then the following procedure must be adopted.			1	If the couplings are not aligned when shunting, the space is reduced to the length of 1 coupling - risk of injury to the assistant.	Use the following safe work procedure.	
2 The loco is to be located and parked at the appropriate distance for the chain to be attached.		A	1	Loco still moving.	Ensure the loco is not moving.	
3 The assistant attaches the chain between the loco and bin or bin to bin then stands clear.		A	1			
4 The assistant directs the loco driver to a position where the couplings are aligned - then connected.		A	1			
5 The loco is parked.		A	1			
6 The chain is removed.		A	1	Loco still moving.	Ensure the loco is not moving.	
7 Continue shunting.			1			

17 Hazardous substances

17.1 General

This section covers the management of hazardous substances. For this Sugar Milling Safety Code, the term *hazardous substance* refers to any substance, material or chemical which has been identified as having the potential to cause an adverse health effect in a person through its use at work. It can include *dangerous goods* and *scheduled poisons* as defined by the relevant authorities, as well as hazardous substances as defined in the *Regulation*. This definition differs from that in the *Regulation* but should assist mills to better identify those substances that pose a risk to the health and safety of workers and others.

Management and employees should seek information from the supplier and/or the MSDS of a substance if there is any doubt about whether or not a substance is hazardous.

For each hazardous substance used at a workplace, the regulation and advisory standard require management to ensure that:

- the MSDS is readily available to anyone likely to be exposed to the hazardous substance;
- a hazardous substance register containing a list of all hazardous substances on site plus a current copy of a MSDS for each substance is maintained;
- labelling and storage comply with the appropriate standards and codes;
- a risk assessment is completed and risks minimised for each hazardous substance;
- workers are aware of the control measures to be implemented;
- appropriate PPE in accordance with the risk assessment is available and used as intended;
- adequate training is provided in the use of the hazardous substance and the recommended PPE;
- monitoring or health surveillance is conducted if required; and
- records are maintained for the specified time.

The risk that needs to be controlled is the potential exposure to a hazardous substance at work by all site personnel and other persons.

Exposure can occur by breathing in the substance, through skin contact where a substance is absorbed through the skin or ingesting when eating with contaminated hands.

17.2 Material safety data sheet (MSDS)

Provision of a MSDS is a key element of the legislation controlling the use of a hazardous substance at a workplace. A MSDS provides advice on:

- the ingredients of a product;
- the health effects and first aid instructions;
- precautions for use; and
- safe handling and storage information.

The MSDS can be in the form of hard copies provided by the supplier of the substance or can be part of an electronic database of MSDS.

A register shall be maintained at the site that includes a current MSDS for each hazardous substance used on site as well as a list of all the hazardous substances. Each MSDS shall be reviewed at least every 5 years to ensure its currency.

A copy of a hazardous substance's MSDS must be kept in close proximity to where the substance is being used to allow a worker who may be exposed to the substance easy access.

17.3 Process chemicals

Hazardous chemicals that may be found on sites controlled by mills include:

- some petroleum products;
- caustic soda;
- hydrochloric, phosphoric, sulphuric and sulphamic acids;
- formaldehyde; and
- lime.

There are others that may be used occasionally but the requirements for MSDS, risk assessments and implementation of control measures still apply.

17.3.1 Risks

The MSDS must be consulted to identify the specific hazards associated with each hazardous process chemical. The main risks associated with the use of the hazardous substances listed involve contact with the skin or ingestion. Inhalation of hazardous substances can also affect the nose, throat and lungs.

In each case, the most likely risk scenarios are those associated with unloading and bulk transfer activities for fuels, liquid caustic soda, hydrochloric and phosphoric acids and formaldehyde. Exposure during normal use would only occur if a plant failure occurs.

17.3.2 Control measures

Specific control measures are required for each separate activity involving a hazardous substance. The most appropriate control measures will depend on the risks arising from the particular circumstances of use of the hazardous substance. The MSDS provides guidance especially for PPE.

The control measures may include:

- isolating the area with barriers and signage;
- detailed operating procedures;
- awareness training in standard operating procedures;
- emergency response training;
- provision of and training with appropriate PPE;
- provision of eye wash and safety shower facilities adjacent to the site but isolated from likely engulfment;
- easy access to MSDS and emergency procedures at the site.

Minimising risks by substitution is not usually an option as process chemicals are selected to achieve a specific result.

It is important to ensure that contractors delivering hazardous process chemicals to storage facilities within the site do not endanger the health and safety of themselves and others.

Requirements for storage facilities are detailed in the ADG code and relevant Australian standards.

17.4 Laboratory chemicals

Laboratory staff may have a more frequent exposure to a range of hazardous substances. It is important to minimise the risk of exposure as acute and chronic health effects may result.

17.4.1 Risks

The likely risk scenarios are associated with handling, mixing and transferring hazardous chemicals such as hydrochloric and sulphuric acids, sodium hydroxide and flammable liquids including ethanol.

Hazardous substances can be formed as products of chemical reactions. Such reaction products are not hazardous substances as defined under the *Regulation* but must be treated as hazardous to health under the *Act*. The risks associated with these reaction products must also be assessed.

17.4.2 Control measures

Specific control measures are required for each separate activity involving a hazardous substance. The most appropriate control measures will depend on the particular circumstances of use and the hazardous substance. The MSDS provides guidance especially for PPE.

The control measures should include:

- detailed analytical procedures;
- training in the standard procedures to be followed;
- emergency response training and access to speciality first aid treatment;
- provision of and training with the recommended PPE for each activity;
- provision of eye wash and safety shower facilities adjacent to the site but isolated from likely engulfment;
- easy access to MSDS, information and emergency procedures in the laboratory;
- adequate labelling of all containers of hazardous substances
- use of automatic pipettes;
- adequate ventilation;
- a high standard of hygiene;
- disposal systems for used PPE;
- separate laundering of laboratory coats, hand towels etc.; and
- use of fume cupboards that comply with AS 2243-8.

Minimising risks by substitution is not usually an option if the analytical procedures used are those recommended by the appropriate authorities.

17.5 Agricultural chemicals

Agricultural chemicals include:

- plant growth regulatory material and pest destroyers including fertilisers and pesticide;
- any hazardous substance or dangerous good; and
- any substance contained in the schedule of drugs and poisons.

The legislative requirements controlling the use of hazardous substances in the factory apply equally to the use of those chemicals nominally designated as agricultural chemicals. However, many of the chemicals used for agriculture are likely to be more toxic than most chemicals used within the factory.

As well as the acute effects on health, many chemicals possess the potential to develop chronic health effects in workers exposed to these chemicals. Application of herbicides should be by licensed operators.

17.5.1 Control measures

Appropriate control measures may include:

- those controls listed in sections 17.3 and 17.4;
- reference to the labels and instructions provided by the supplier of the chemicals;
- assessment of the local environment and the weather;
- maintaining accurate records of all chemical applications and use;
- adequate storage facilities in line with the manufacturers recommendations;
- clean-up and maintenance of equipment after application completed;
- disposal of empty containers to approved sites, the supplier or accredited disposal organisations.

17.6 Miscellaneous solids, liquids and gases

A large number of substances used in the factory are either potentially hazardous or include components that are hazardous. These include:

- cylinders of compressed gases;
- paints, thinners, solvents and glues;
- fuels, oils and lubricants;
- EDTA.

As well as the control measures listed in sections 14.3 and 14.4, appropriate control measures to minimise the adverse effects from exposure to these materials can include:

- high standard of housekeeping;
- correct storage facilities and signage; and
- controlled access to and use of these types of materials;

17.7 Substance confinement and control

Because of the type of work that is undertaken in sugar factories and the range of hazardous substances used, there is a potential for emergencies to occur. The emergency could result from a small spill of a hazardous substance in the laboratory or it could involve a major chemical spill, explosion and serious injuries. An uncontrolled release of gas from a cylinder or tank could also trigger an emergency.

17.7.1 Risks

The risks associated with a chemical spill include the toxic effects of the chemical involved, possible reactions with other chemicals including air and water once the chemical is released and corrosion effects of the chemical on plant items. The potential for injury or illness during the clean-up phase must also be considered.

Fully documented plans are required to minimise the adverse effects of an unplanned release of a hazardous substance. The booklet *SAA/SNZ HB76: Dangerous goods – Initial emergency response guide* provides useful general information on the different hazardous substances groupings. This booklet can provide immediate information and advice to persons handling emergency situations.

17.7.2 Control measures

The most appropriate control measures will depend on the particular circumstances of the emergency and the hazardous substance involved. The MSDS includes a section on appropriate emergency actions and clean-up procedures.

Apart from the control measures listed previously for hazardous substances, measures specific to emergencies may include:

- isolating the area with barriers and signage;

- detailed emergency response plans, training and exercises;
- easy access to the MSDS and emergency procedures at the site;
- first aid supplies, antidotes and treatments relevant to injuries that are likely to occur;
- easy access for emergency vehicles to all parts of the factory;
- provision of suitable equipment and materials such as absorbents, neutralising materials and clean-up tools.

Emergency procedures to deal with spill control should address, among other things:

- quantity of spillage;
- site of spillage;
- containment and clean-up procedures;
- notification of relevant authorities;
- evacuation, and
- decontamination.

A periodic review process should be undertaken to ensure the procedures are able to meet changing workplaces and environments. Holding regular emergency and evacuation drills and evaluation enables periodic review to occur.

17.8 Lead

All sugar factory laboratories use lead in the form of dry lead acetate and 'wet lead'.

The obligations of management and workers are detailed in the *Workplace Health and Safety Regulations 1997, Part 14*.

17.8.1 Risks

Lead can be inhaled through dust or fume or smoking with contaminated fingers and swallowed through eating contaminated food. Lead absorbed by a pregnant woman can affect the developing baby, particularly the baby's nervous system.

17.8.2 Control measures

The results of a lead monitoring program conducted by the Division of Workplace Health and Safety during the 1996 crushing season determined that the use of lead in mill laboratories did not constitute a lead risk job (ASMC, 1997). Provided that appropriate control measures are adhered to, then the status as a lead job rather than a lead risk job can be maintained. However, the report recommends that all new laboratory workers have baseline and mid-season samples to identify those workers whose absorption of lead is significant.

Appropriate control measures include:

- label all containers in which any lead compound is stored;
- avoid generating dust when handling dry lead acetate;
- when transferring to smaller containers:
 - use PPE (face shield, P2 dust respirator, gloves); and
 - transfer in a well ventilated area free of strong air currents;
- high standards of personal hygiene;
- do not allow drinking from laboratory taps;
- training and supervision to ensure that the correct procedures are followed;
- maintain appropriate emergency response treatments; and
- provide automatic dispensers for wet lead.

17.9 Asbestos

Inhalation of asbestos fibres has been linked to three respiratory diseases - asbestosis, mesothelioma and lung cancer. These three diseases are characterised by long latency periods, that is, 20-40 years from exposure to the onset of disease.

Removing and disposing of asbestos is a prescribed occupation and workers engaged in these activities must hold a certificate to work as an asbestos removalist. An asbestos removalist is required to prepare a workplace health and safety plan to minimise the risk of exposure to airborne asbestos fibres prior to removing asbestos material from an asbestos removal area.

Where there is a risk of asbestos fibres entering the atmosphere, the removal, maintenance or demolition shall be carried out in accordance with part 11 of the *Regulation*. Where the asbestos is in the form of AC sheeting, the removal, maintenance or demolition be carried out in accordance with Workplace Health and Safety (*The Safe Treatment, Removal and Disposal of Asbestos-Cement Sheeting and Asbestos Coated Metals*) Advisory Standard. An example of Asbestos Gasket/Joining Removal Procedure is contained in section 17.16.

17.9.1 Risks

Airborne asbestos fibres can result from:

- the release of asbestos fibres through renovation, maintenance or demolition;
- accidental contact with the asbestos material causing fibres to break free; and
- failure to adequately maintain an asbestos material resulting in the release of airborne asbestos fibres.

17.9.2 Control measures

Control measures to minimise the risks associated with airborne asbestos fibres at mill workplaces include:

- A register containing the position, type and quantity of asbestos material shall be kept on site in an area accessible to all workers;
- All known asbestos containing material shall be labelled;
- Isolation and/or containment of the asbestos material to prevent the release of airborne fibres;
- No material containing any form of asbestos other than chrysotile shall be brought onto a mill workplace, nor shall it be used at any mill workplace;
- Where there is a possible risk of asbestos fibres entering the atmosphere, the renovation, maintenance or removal shall be carried out by an asbestos removalist;
- The work shall be carried out inside a containment barrier which will prevent anyone in the asbestos removal site being exposed to an atmospheric concentration of airborne fibres of more than 0.02 fibres/mL;
- A workplace health and safety plan shall be drawn up in consultation with the workers for all tasks requiring the removal, maintenance or demolition of asbestos materials;;
- The removalist shall take into account the timing of the removal, ie., during holidays, weekends, after hours etc;

17.9.3 Monitoring

When carrying out renovation, maintenance or removal of asbestos products and there is a risk of asbestos fibres entering the atmosphere outside the containment barriers, the removal site's atmosphere is to be monitored to find out if asbestos fibres are entering the site's atmosphere. This is to be carried out in accordance with '*Guidance Notes On The Membrane Filter Method For Estimating Airborne Asbestos Dust*' (other than part 1) contained in NOHSC's document entitled 'Asbestos- Code of practice and Guidance Notes'.

17.10 Waste disposal

Disposal methods must be considered as part of the risk assessment process for use of hazardous substances. It would be impossible to detail procedures for every possible disposal problem that could be encountered in a factory. The MSDS provides some information on safe disposal methods for a hazardous substance.

Some of the common wastes generated within the factory are spent process chemicals, oils and greases, as well as containers, plant etc. Wastes generated by routine laboratory analyses generally fall within three categories:

- those that can be recycled back to the factory e.g. juices etc used for brix determinations;
- those contaminated with lead from laboratory analyses; and
- those that can be recycled to the bagasse stream and incinerated e.g. from disintegrator and fibre analyses. These contaminated with lead are considered hazardous.

17.10.1 Risks

The risks associated with disposal of hazardous substances may result from:

- chemical reactions with other wastes within the waste disposal system resulting in hazardous vapours, heat and/or ignition;
- environmental pollution;
- accumulation of vapours in confined spaces within the disposal system.

17.10.2 Disposal options

Options for the safe disposal of hazardous wastes and containers include:

- disposal of small quantities of water soluble chemicals and inorganic metal compounds to sewerage systems with large quantities of water;
- disposal to a hazardous waste dump;
- encapsulation or immobilisation followed by disposal to a dump site; and
- regeneration, recovery or recycling.

For the disposal of lead wastes generated by laboratory analyses of process streams, the procedures developed by the ASMC Technical Committee shall be followed.

Procedures for the disposal of empty containers should include:

- triple rinse to ensure the removal of hazardous residues;
- puncture or crush to prevent re-use; and
- secure storage at a central location until collection and disposal can be arranged through the local council or waste disposal contractor.

Disposal procedures should also be addressed by the mill's environment policy and procedures.

17.10.3 Control measures

Refer to the MSDS for information on appropriate control measures for the particular hazardous wastes to be disposed. Advice may also be sought from the supplier and/or the manufacturer of the substance.

17.11 Monitoring and Health Surveillance

Monitoring must be provided if the risk assessment determines that:

- the substance is listed in schedule 6 of the Regulation; and
- the degree of risk is significant.

The monitoring shall include:

- regular checking of the risk from, or exposure to, a hazardous substance; and
- the effectiveness of the control measures.

Health surveillance must be provided if the risk assessment determines that:

- exposure to a substance listed in schedule 6 of the *Regulation* is significant; or
- a worker has been exposed to a substance listed in schedule 6;
- the degree of risk to health is significant;
- an identifiable adverse effect may be related to the exposure;
- the health effect may happen at the workplace; and
- a valid technique exists for detecting the health effect.

The worker must be consulted before choosing a doctor to do, or supervise, the surveillance. In each case, persons likely to be involved with the monitoring or surveillance program shall be kept informed of the results and workers records shall remain confidential.

17.12 Registers and Records

A register should be maintained at the workplace which contains:

- a list of all hazardous substances at the workplace; and
- a current MSDS for each hazardous substance.

If a risk assessment determines that use of a hazardous substance could cause a significant risk to health then the following records must be kept for 30 years from the date of each record:

- the risk assessment;
- monitoring results; and
- health surveillance reports.

If use of the hazardous substance does not cause a significant risk to health then the risk assessment must be kept for 5 years from the date of the risk assessment.

17.13 Example: Liquid Caustic Receiving Procedure

Liquid caustic is received in bulk by road tanker. It is a corrosive chemical and causes severe chemical burns to all human tissues on contact.

Unloading operations are to be carried out by the driver under the supervision of trained personnel. The personnel qualified at *the mill* at present are the Production Department Supervisors and the day laboratory assistant.

Normally, the truck driver will unload the caustic with only minimal assistance from mill employees during the initial connections and the final disconnection steps. Only if there is a fault in the equipment will the mill employees be more deeply involved in the operations. The mill employees will be contactable via the laboratory building at all hours and the store during office hours 7.30am – 4.00pm. During office hours, the truck driver should contact the store on arrival.

17.13.1 Protective Clothing

The following personal protective equipment must be worn by personnel unloading the liquid caustic:

- ◆ PVC overalls
- ◆ PVC gloves
- ◆ Full face shield
- ◆ Rubber boots

The area around the truck is “roped” off during the unloading operation. The roped off area should include any potential splash areas. Personnel are only permitted to enter this area with express permission of the supervisor and wearing the above specified equipment.

This equipment is stored in a locker adjacent to the caustic unloading pump. A safety shower and face rosette is located nearby.

17.13.2 Detailed Procedure

This procedure has been written to ensure a safe and quick unloading occurs. It is important that the steps are executed in the following order.

1. Ensure that the standby cold water hose is available and operational.
2. Check that the washdown pump (near No 5 Mill) is running.
3. Check road tanker contents and caustic tank level to ensure that the caustic tank has sufficient storage for the entire tanker load.

When this condition is satisfied, then the supervising personnel sign the “permission to unload” form for the driver.

4. Put on protective equipment.
5. Connect the flexible hoses from the tanker to the mill Kamlok connection. Either the mill pump or the tanker supplied pump may be used. In either case, all hoses should be connected but all valves should remain closed.
6. Open the water flushing valve on the mill caustic pump and progressively open valves back to the tanker. At each valve, check each connection for leaks. Fix leaks progressively.
7. Close off water flush valve and open valves to mill storage tank. Double check when finished to ensure there are no closed valves from the pump to the mill storage tank.
8. Tanker driver should now open the tanker outlet valves to the pump (either the tanker pump or the mill unloading pump).
9. Turn on the pump. Check that the caustic is flowing freely into the mill storage tank.
10. Check that no leaks develop during the pumping operation.
11. When the tanker is empty, turn off pump. Close valve to mill storage tank. Open water flushing valve to flush water from the delivery Kamlok connection through the delivery hoses to the tanker.
12. Run water for a couple of minutes through lines to tanker until the driver is satisfied he has enough water to flush lines. Close water flushing valve.
13. Open valves to mill storage tank. Pump dilute caustic from tanker to mill storage.

14. When the tanker is empty, turn off pump and isolate tanker outlet valves. Isolate the mill storage tank. Remove hose from tanker, discharge valves and place on floor. Open flushing water valve to flush hoses and pump onto floor for a couple of minutes until clear.
15. Close flushing valve, disconnect hoses and driver is free to pack up his hoses.
16. Drain the line from the mill storage tank back to the Kamlok deliver point to the drain pipe. Take down "ropes" around the unloading area.
17. Sign delivery docket for caustic. Clean and return personal protective equipment.

17.14 Example: Formaldehyde Receival Procedure

Formaldehyde is received in bulk by road tanker. It is a hazardous substance and can cause severe irritation of skin, eyes and nasal passages. If open to atmosphere, irritating vapours are released.

Unloading Operations are to be carried out:

- ◆ By fully trained personnel only.
- ◆ In the presence of the Safety Officer or a qualified First Aider.
- ◆ In daylight hours only.

Protective Clothing

The following must be worn by all personnel who enter the receival area:

- ◆ PVC overalls
- ◆ PVC gloves
- ◆ An air supply hood or a full face mask and filter canister.

Protective clothing is stored in a locker near the formaldehyde tank. It should be checked before unloading commences.

No Smoking

Smoking is not permitted in the receival area.

Detailed Procedure

This procedure has been found to be safe and convenient in practice. The order of each step in the procedure is designed to ensure that risks are eliminated before a potentially hazardous task is performed.

IT IS IMPORTANT THAT THIS PROCEDURE BE CARRIED OUT IN THE ORDER SPECIFIED.

It will be necessary to wear the air hood, gloves and overalls when opening tanker valves.

1. Before making connection to tanker:

- ◆ Close unloading pump suction valve.
- ◆ Connect the flexible hose from the pump outlet in the formaldehyde fill point.
- ◆ Unlock the formaldehyde fill valve using the correct key.
- ◆ Open the formaldehyde fill valve using the correct key.
- ◆ Open the formaldehyde fill valve using the correct key.
- ◆ Open the formaldehyde fill valve.
- ◆ Open water flush valve and ensure unloading pump delivery valve is open.
- ◆ Start unloading pump, run for 30 seconds and check for leaks. (Repair leaks if found).
- ◆ Stop the unloading pump.
- ◆ Shut the water flush valve and the unloading pump delivery valve.

2. Check tanker and hose for leaks:

- ◆ Ensure all tanker outlet valves are closed.

- ◆ Connect the flexible hose from the unloading pump suction to the tanker outlet.
 - ◆ Open unloading pump suction valve.
 - ◆ Open water flush valve.
 - ◆ Check for leaks and repair if found.
 - ◆ If no leaks are detected, shut the water flush valve.
 - ◆ Open the unloading pump delivery valve.
- 3. Unloading of formaldehyde:**
- ◆ Unlock the 3-way valve handle and open spill valve to the collection tank.
 - ◆ Put the air hood, gloves and overalls on.
 - ◆ Ensure that the unloading pump delivery and suction valves are open.
 - ◆ Open the tanker unloading valve.
 - ◆ Start the unloading valve.
 - ◆ Start the unloading pump.
 - ◆ Check system for leaks.
 - ◆ If OK, remove the air hood, gloves and overalls.
 - ◆ Remain in the vicinity while unloading is taking place.
 - ◆ Use PPE if opening other compartment valves on the tanker.
 - ◆ When tanker is empty, stop the unloading pump.
- 4. Water flush procedure:**
- ◆ Ensure that the tanker unloading valve is open.
 - ◆ Shut the unloading pump delivery valve.
 - ◆ Open the water flush valve and back flush into the tanker (all compartments) for approx. 90 seconds.
 - ◆ Shut the water flush valve.
 - ◆ Open the unloading pump delivery valve.
 - ◆ Start the unloading pump.
 - ◆ When tanker compartments are empty, close the tanker unloading valves and if available, open the airline to the tanker distribution point and keep the pump running. Blow air through the system for approx. 20 seconds.
 - ◆ If no air is available, stop the unloading pump.
 - ◆ Leave the water and pump running for approx. 90 seconds.
 - ◆ When time has expired, stop the unloading pump and close the water flush valve.
 - ◆ Open the spill valve to effluent, remove the handle and return to the correct position.
- 5. Air flush procedure:**
- ◆ Close the unloading pump delivery valve.
 - ◆ Open the air flush valve for approx. 15 seconds to evacuate the delivery line.
 - ◆ Close the air flush valve.
 - ◆ Close and lock the formaldehyde fill valve.
- 6. Tidy up procedure:**
- ◆ Remove the flexible hose from the formaldehyde fill point.
 - ◆ Replace dust cap into the end of the fill hose.
 - ◆ Remove the flexible hose from the tanker unloading point and from the pump suction.
 - ◆ Return hose to the correct position and allow to drain.
 - ◆ Hose down the area with water after the tanker has left.
 - ◆ Return the PPE to the correct location.

17.15 Example: Procedure to be used when Working on the Formaldehyde System

Before any repairs to pumps, valves, pipelines or vessels commence, strict safety rules shall apply.

1. Contact the Shift Chemist who will ensure adequate precautions are implemented to remove any hazard.
2. Rope off or barricade the area that work is to be conducted in.
3. Isolate the system, or part of the system, to be repaired.
4. Completely flush out the section to repaired using copious quantities of cold water.
5. Ensure emergency showers are operable.

6. Hose down any area where leaks have occurred.
7. Ensure there are no naked flames or smoking in the area to be repaired.
8. Carefully read the instructions below.

FORMALDEHYDE

Formaldehyde is a liquid which vaporises readily to a gas with a highly irritating odour. This vapour is flammable and, in some circumstances, is explosive. Flames, sparks, highly heated surfaces and smoking are prohibited.

HANDLING

Formaldehyde may be handled with complete safety, provided simple rules are observed.

SAFETY CLOTHING

PVC overalls, PVC gloves, air supply helmet and PVC footwear must be worn whenever there is risk. This equipment is available at the laboratory. An assistant must be available at all times and must also wear safety equipment whenever there is risk. When work is completed, wash protective clothing with clean water and dry before returning to the laboratory.

SPILLAGE

Remove any spillage by thoroughly flushing with water.
Prohibit smoking and ensure that there are no flames, sparks or highly heated surfaces in the vicinity.

CONTAINERS

Do not use or re-use formaldehyde containers for storing other chemicals or materials unless they have been thoroughly cleaned. Residues may react vigorously or even explosively with other chemicals.

FIRE

In case of fire:

1. Stand upwind.
2. Use CO₂ foam or dry chemical extinguishers for minor fires.
3. Use copious quantities of water to extinguish larger fires; to disperse the concentration of formaldehyde; and to cool containers and pipelines.

If the fire becomes uncontrollable, evacuate the area and turn on the fire alarm at the fire shed to notify the fire squads.

FIRST AID

GASSING

Remove the patient to fresh air, remove all contaminated clothing, completely deluge the affected patient with cold water to remove all traces of chemical and lay down to rest.

If the patient is not breathing, clear his airway and begin expired air resuscitation.

Call for first-aid attendant immediately.

Remove contaminated clothing downwind.

Trained first-aid personnel may administer oxygen.

Keep patient warm.

Seek urgent medical attention.

EYE CONTACT

Hold eyes open and irrigate continuously with cold water for a minimum of 15 minutes. Transport to doctor or hospital.

SKIN CONTACT

Immediately remove all contaminated clothing and footwear, and wash affected areas with soap and water.

17.16 Example – Asbestos Gasket/Joining Removal Procedure

POLICY

In accordance with accepted safety management practice, it is the Policy of the Mill to ensure the Employee/Contractors on the Mill Site under the control of the Mill are aware of the procedures for the removal of Asbestos Gasket/Joining.

1.0 SCOPE

These procedures cover the Mill Site and all sites under the control of the Mill and applies to all employees/contractors under the Mill's control.

2.0 RESPONSIBILITIES

Department Heads shall ensure adequate resources are provided to fulfil the requirements of this guidance note.

The supervisor along with those persons directly involved in the work shall be responsible for assessing the risk and ensuring that the control measures provided are adequate and in place.

Individuals shall follow instruction given within the scope of this guidance note to ensure the safety of themselves and others.

3.0 PROCEDURES

1. When it is necessary to remove joining or gasket the health and safety adviser must be notified.
2. Disposable overalls and a class "m" respirator must be worn whilst removing the gasket/joining.
3. Whilst removing the gasket/joining it must be sprayed regularly with a soapy solution. This will minimise the risk of fibres becoming airborne.
4. The gasket/joining shall not be removed by use of a grinder, saw, file or any tool that may cause fibres to become airborne. The gasket must be removed with a sharp instrument such as a knife or a scraper.
5. Whilst the gasket/joining is being removed, plastic sheeting must be placed below the material so as to retain any material that may fall. Plastic sheeting and plastic bags are available from the mill store.
6. The immediate working area around the job site must be barricaded off during the removal process.
7. When the removal is completed the gasket/joining must be placed in the plastic bag provided, along with the overalls, respirator and plastic sheet from beneath the project. The plastic bag is then sealed with tape and then an asbestos sign is attached to it for identification.
8. The area must be checked thoroughly before regular maintenance can be continued and the workplace health and safety adviser must be notified immediately on completion of the job.
9. The bag may be then placed outside the health and safety adviser's office to await proper disposal.

4.0 RELATED DOCUMENTS

Contractors and their Employees Working on Site
Policy and Procedures for Use and Control of Personal Protective Equipment
Procedure for Barricading of Hazardous Areas.

5.0 REFERENCES

Queensland Workplace Health and Safety Act 1995
Mill Asbestos Committee

6.0 REVIEW

This procedure shall be reviewed by the safety committee if conditions change or at intervals not exceeding two years.

17.17 References

- ASMC (1997). *Lead compliance standard: Sugar industry lead monitoring program - crushing season 1996 - 'lead risk job'*. Circular to Mills - Safety No. 9, ASMC Brisbane.
- ASMC Technical Committee (1997). *Packaging and transport manual for recycling of laboratory material from sugar mills*. Circular to Mills No. 77, ASMC Brisbane.
- Federal Office of Road Safety. *Australian code for the transport of dangerous goods by road and rail (ADG code)*. 5th ed., AGPS, 1992.
- National Occupational Health and Safety Commission. *Exposure standards for atmospheric contaminants in the occupational environment* [NOHSC:1003(1991)], AGPS, 1991
- National Occupational Health and Safety Commission. *List of designated hazardous substances* [NOHSC:10005(1994)], AGPS, 1994
- Standards Australia:
- AS 1596 The storage and handling of liquified petroleum gas.*
 - AS 1940 The storage and handling of flammable and combustible liquids.*
 - AS 2243-8 Fume cupboards.*
 - AS 2507 The storage and handling of pesticides.*
 - AS 2507 Safe storage and handling information cards for hazardous substances.*
 - AS 3780 The storage and handling of corrosive substances.*
 - AS 4332 The storage and handling of gases in cylinders.*
 - HB76 Dangerous goods – Initial emergency response guide.*
- Workplace Health and Safety Regulation 1997 Part 13 (Hazardous Substances)
- Workplace Health and Safety Regulation 1997 Part 14 (Lead)
- Workplace Health and Safety (Lead at work) Brochure 1996
- Workplace Health and Safety (Management of hazardous substances at a workplace) Advisory Standard 1995
- Workplace Health and Safety (The selection, provision and use of personal protective equipment) Advisory Standard 1991.
- Workplace Health and Safety (The storage and use of chemicals at rural workplaces) Advisory Standard 1994.
- Workplace Health and Safety (Hazardous substances) Advisory Standard 1998.

18 Noise and vibration

18.1 Noise

Noise is a major hazard within any sugar mill. Sources of excessive noise include:

- plant associated with steam and compressed air (vents, pressure reducing valves, silencers, pipes, turbines);
- power houses;
- particular plant items (shredders, high speed gearboxes, fans, blowers, centrifugals);
- miscellaneous items (vacuum breakers, air operated valves, locomotives, warning horns, colliding cane bins, truck movements);
- workshop activities (grinding, hammering, metal cutting operations etc.).

Section 68 of Part 10 – Noise of the *Regulation* defines excessive noise as a level of noise above:

$$L_{Aeq,8h} \text{ of } 85 \text{ dB(A)} \text{ or } L_{peak} \text{ of } 140 \text{ dB(Lin)}.$$

Auditory risk to workers from noise exposure is permanent loss of hearing and tinnitus. Health risks are also associated with exposure to noise and may include, among others, increased heart rate, higher blood pressure, stress and fatigue, to name only the most important ones.

The risks to workers health and hearing can be prevented or minimised by assessing the risks and:

- conducting noise exposure surveys in accordance with AS/NZ 1269.1, to identify risk areas and/or activities;
- developing a noise policy;
- developing a noise management program in accordance with at least the elements of AS/NZ 1269.3;
- implementing a program for conducting noise surveys on a regular basis and correcting any increases in noise exposure levels;
- implementing noise control measures in consultation with the workers concerned, and in accordance with the hierarchy of controls;
- consulting with workers about their needs and expectations;
- providing management and workers with education, training and information on noise, its effects and the need for its control; and
- providing regular audiometric testing to exposed workers.

18.1.1 Control measures

Engineering noise control measures are the most effective form of reducing excessive noise levels and should be selected when practical. Hearing protectors must be worn in situations where the noise cannot be practically reduced to below the legal limits by engineering, and/or administrative control measures or, as an interim, until such measures can be put in place.

Workers provided with personal hearing protectors need proper training and instruction on their correct use, care and maintenance. Selection of personal hearing protectors must be on the basis of individual fit, comfort, work tasks and work environment with respect to protectors being worn and therefore achieving the noise attenuation required.

Control measures to minimise noise exposure may include:

New plant:

- Design, purchase or construct plant or the workplace to minimise noise levels.

Existing plant:

Engineering control measures:

- treat the noise source (silence noisy plant, redesign or modify);
- treat the noise transmission path (enclose noisy plant); or
- treat the receiver (locate the operator in a soundproof enclosure)

Administrative control measures:

- job rotation;
- adequate plant and equipment maintenance program;
- buy quiet program;
- signage indicating noises greater than 85 dB(A) and hearing protection must be worn;
- personal hearing protectors;
- use of hearing protectors is a condition of employment in hearing protection areas.

Administrative controls are not as effective in the long term as engineering control measures.

A policy of personal hearing protection for all persons entering factory processing areas is recommended.

18.1.2 Monitoring

A program for the regular monitoring of noise exposure levels and checking of the effectiveness of noise control measures is required. Maintenance schedules should be put in place to ensure plant, acoustic enclosures and silencers are maintained in optimum condition to achieve target noise levels.

A monitoring program should include:

- regular noise exposure surveys of workers;
- identification of sources of hazardous noise;
- assessment of noise control measures;
- suitability of personal hearing protectors provided;
- regular audiometric testing;
- periodic review of the effectiveness of the noise management program based on the results of the noise surveys, audiometric tests, use of hearing protectors and other control measures.

18.1.3 References

Workplace Health and Safety Act 1995, Part 3, Division 2, Sections 28 to 36.

Workplace Health and Safety Regulation 1997, Part 10 Section 68 and 69.

Workplace Health and Safety (Noise) Advisory Standard 1996.

Workplace Health and Safety (Workers, employers and noise at work) Brochure BRO004, 1996.

Standards Australia:

AS/NZ 1269 – 1998, *Occupational Noise Management*, Parts 1, 2, 3 and 4.

AS 1259.1 – 1990, *Sound Level Meters, Part 1 Non-Integrating*.

AS 1259.2 – 1990, *Sound Level Meters, Part 2 Integrating-Averaging*.

18.2 Vibration

Many activities in sugar mills cause vibration which may be either deliberately introduced as part of a process or occurs as by product. Workers involved in the various processes may therefore be exposed to whole body, or hand – arm vibration. Both types of exposure are capable of causing ill health effects, disorders or disease. Some of the health effects of the whole body vibration are:

- damage to bones and joints, especially in the lower spinal region;
- variations in blood pressure;
- visual impairment;
- problems with the balancing system in the ear leading to symptoms like motion sickness and nausea.

Some of the health effects from hand – arm vibrations are:

- nerve and blood vessel degeneration leading to vibration white finger syndrome (VWF);
- pain and cold sensation between attacks of VWF;
- loss of grip strength;
- damage to joints and muscles in wrists and/or elbows;
- carpal tunnel syndrome;
- bone cysts in fingers and wrists.

Studies have shown that simultaneous exposure to noise and vibration causes greater hearing loss than exposure to either source alone.

There are no set limits for the exposure to vibration as is the case with exposure to noise. Instead, AS 2670.1 for whole body vibration and AS 2763 for hand – arm vibration provide for boundaries and guidelines to limit exposure.

The risks to workers health can be prevented or minimised by:

- assessing the risks including conducting vibration exposure surveys in accordance with AS 2760 or AS 2763 as appropriate, to identify risk processes and/or activities;
- developing a vibration policy;
- developing a vibration management program;
- implementing a program for conducting vibration surveys on a regular basis and corrective actions;
- implementing vibration control measures in consultation with workers and the engineering/maintenance section of the sugar mill and in accordance with the hierarchy of controls;
- providing management and workers with education, training and information on vibration exposure, its effects and the need for its control; and
- providing regular medical check ups to exposed workers.

18.2.1 Control Measures

Engineering controls, once in place, operate all the time whereas the effectiveness of personal protective equipment depends on the moods and behaviour of the wearer. Engineering control measures are the most effective form of controls and the use of personal protective equipment the least effective form of control. Reduction of vibration in many instances also leads to reduction in noise emissions. Control of vibrations in work processes therefore serves an important dual purpose.

Control measures to minimise exposure to vibration include:

New and existing plant:

Engineering control measures:

- treat the vibration source (isolate vibrating plant from its foundation through dampers and springs, redesign or modify);
- treat the vibration transmission path (isolate ducts etc, from stationary plant); or
- treat the receiver (isolate control rooms/enclosures from vibrating plant and surfaces)
- use of tools with anti vibration handles
- maintain properly sharpened cutting tools

Administrative control measures:

- job rotation, to limit vibration exposure to no more than 4 hours per shift;
- adequate plant and equipment maintenance program;
- personal protective equipment, eg anti vibration gloves
- use minimum hand grip on tools consistent with safe work practices;
- avoid smoking as this restricts the blood vessels.

Administrative controls generally are not as effective in the long term as engineering control measures. Workers provided with personal protective equipment need proper training and instruction on their correct use, care and maintenance.

Selection of personal protective equipment must be on the basis of individual fit, comfort, work tasks and work environment with respect to protectors being worn and therefore achieving the noise attenuation required.

18.2.2 Monitoring

A program for the regular monitoring of vibration exposure levels and checking of the effectiveness of vibration control measures is required in each sugar mill. Maintenance schedules should be put in place to ensure vibration insulators on plant are maintained in optimum condition to achieve maximum vibration reduction.

In accordance with AS 2763 hand – arm vibration exposure is expressed as an average exposure over a four hour period in a shift. Where exposure exceeds an acceleration value of 2.9m/s^2 , the worker shall be medically examined for the presence of VWF or susceptibility for VWF and people with or susceptible to shall not work with hand – arm vibration.

Medical surveillance must be conducted by medical practitioner or trained qualified nurse, and should include:

- pre-employment history, including the taking of medication for migraine, hypertension or heart disease;
- examination within 6 months after commencing employment;
- examination taken before a shift and after at least 12 hours away from exposure;
- no smoking for 4 hours prior to test;
- challenge tests;
- information to workers on VWF and other symptoms of vibration exposure.

A monitoring program should include:

- regular vibration exposure surveys of workers;
- identification of sources of hazardous vibration;
- assessment of vibration control measures;
- suitability of any personal protective equipment provided;
- regular medical checks at the discretion of the medical practitioner;
- periodic review of the effectiveness of the vibration management program.

18.2.3 References

Workplace Health and Safety Act 1995, Part 3, Division 2, Sections 28 to 36.

Standards Australia:

AS 2760.1 - *Vibration and Shock – Guide to the Evaluation of Human Exposure to Whole Body Vibration*

AS 2763 - *Vibration and Shock – Hand Transmitted Vibration, Guidelines for Measurement of Human Exposure.*

19 Personal protective equipment (PPE)

This section covers the obligations of management for the selection, maintenance, training and use of personal protective equipment and clothing used to protect individuals from hazards. PPE includes eye protection, hand protection, footwear, breathing equipment, hearing protection and full body protection.

The control of risks should preferably be dealt with by design, substitution, redesign, separation, or administration. These controls generally reduce or minimise risk in a more reliable manner than PPE. PPE should only be used where other methods of control are not practicable in the circumstances.

The Workplace Health and Safety (*The selection, provision and use of personal protective equipment*) Advisory Standard sets out a method for identifying and controlling risks where PPE is deemed necessary.

Selection of PPE must be on the basis of individual fit, comfort, work tasks and work environment with respect to protectors being worn and therefore achieving the desired result.

Where PPE is provided for a task, the worker has an obligation to use the equipment provided. Management also has an obligation to ensure the worker uses the equipment properly.

19.1 Recommendations

Where hazardous substances are used or there are risks to health or safety from other agents in the workplace, the risk assessment process shall identify any need for and the extent of control of the risks arising from these hazards. In deciding on the control measures to be put in place, risk assessment should direct the employer to adopt PPE only if other controls cannot provide cost efficient and acceptable solutions. Basic guidance on PPE use is provided by the MSDS.

When indicated by a risk assessment that a certain type of PPE is required for a particular task or work area, that requirement should be defined and documented.

PPE shall be supplied and used when required by a *Regulation* or Advisory Standard.

Appropriate clothing should be supplied and compliance with its use should be ensured where workers:

- are working near or on live electrical conductors;
- may be subjected to high doses of UV radiation such as
 - working outdoors; or
 - working with or near metal cutting and/or welding equipment;
- are working with hazardous materials and the risk assessment and/or MSDS indicates a requirement; and
- are working on, near or where there is a potential for hot surfaces, intense heat or heat and flames.

High visibility clothing should be supplied and compliance with its use should be ensured where a risk assessment indicates visibility may be limited, e.g. loco crews on afternoon and night shifts.

Appropriate PPE should be supplied and compliance with its use should be ensured in designated areas according to site policy, for example:

- eye protection areas
- hearing protection areas
- head protection areas
- foot protection areas (e.g. workshops, undulating ground where ankle support is needed)

Policies and standard work procedures should be documented and communicated to ensure compliance with these risk minimisation strategies.

Each work area shall be signposted where prescribed PPE is mandatory.

Personal protective equipment should always be used and its use monitored where:

- the need is stated in safe work practices;
- the need is stated in operator/procedure manuals; or
- the hazard cannot be managed according to the hierarchy of controls.

PPE should be regularly inspected and, if required, tested, repaired, cleaned, or replaced. Records of the inspections should be kept.

Standard work procedures should be prepared when PPE is required for particular tasks performed regularly. These instructions should be made easily accessible to all personnel.

Any changes or modifications to process, working conditions or procedures, materials used or technology should be assessed and, if required, corresponding changes should be made to the required PPE used by personnel who may be affected by the modification.

Where a risk assessment indicates a need, visitors to the site shall be issued with appropriate PPE and trained in its use appropriate to the areas visited.

19.2 Training

Management should ensure that all employees are trained in the correct use of PPE. Management should maintain a record of the training provided to employees on the use of PPE.

19.3 Review

Management should continually review the use of PPE. The purpose is to reinforce the requirement to use PPE where a risk assessment has determined a requirement and to identify where PPE is not being used correctly or is deteriorating. It is also necessary to review the tasks being done and conduct ongoing risk assessments to identify when the use of PPE can be suspended or reduced.

All new or changed PPE purchases should be made after consultation with site safety teams and workers. Occupational health and safety professional may be consulted for advice on specialised PPE.

19.4 Reference

Standards Australia. AS1319 – *Safety signs for the occupational environment*.

Standards Australia. HB9 – *Occupational personal protection*.

Standards Australia. AS/NZS 1715 – *Selection, use and maintenance of respiratory protective devices*.

Standards Australia.. AS/NZS 1716 –*Respiratory protective devices*.

Workplace Health and Safety (The selection, provision and use of personal protective equipment) Advisory Standard 1991.

20 Workplace environment

20.1 Atmospheric contaminants

Most atmospheric contaminants likely to be encountered in a mill workplace are classed as irritants and do not constitute a serious risk to worker's health. These include bagasse fibres, sugar dust and dirt. Exceptions could include asbestos, lead, mineral fibres and crystalline silica dusts, and spores from stored bagasse. Smoke from fires can contain toxic substances as does cigarette smoke.

Health risks associated with bagasse include the development of bagassosis; an allergic reaction of the lung tissue in the presence of *Thermoactinomyces Sacchari* spores. Research has indicated that bagasse does not cause bagassosis but if bagasse is stored in damp conditions, *T. sacchari* bacteria can propagate. The spores of this bacterium can give rise to bagassosis in workers.

There is an exposure standard for inspirable sugar dust that must be observed. The allowable time-weighted average (TWA) airborne concentration for sugar dust is 10 mg/m³. This value is a standard value for all inspirable dusts containing no asbestos and <1% crystalline silica. Inspirable dust refers to particles where the equivalent aerodynamic diameter is greater than 10µm

Under certain conditions, sugar dust can also be explosive. The conditions that must be fulfilled simultaneously for a sugar dust explosion to occur are:

- at least 9% by volume (at atmospheric pressure) of oxygen; and
- a sugar dust concentration greater than 20 g/m³; and
- a minimum ignition energy of 30 mJ; or
- for an electrostatic spark ignition – a minimum field strength of 20 kV/cm.

Synthetic mineral fibres or man-made mineral fibres is a collective term used to describe fibres such as fibreglass, rockwool and ceramic fibres. The biological effects of these fibres are determined by the fibre diameter and length and chemical nature. For respirable fibres, a TWA exposure standard of 0.5 fibres per mL of air applies to synthetic mineral fibres. Respirable fibres are those with an equivalent aerodynamic diameter below about 5 µm. For inspirable fibres, where almost all the airborne material is fibrous, a TWA exposure standard of 2 mg/m³ is proposed.

Silica is a name describing various forms of silicon dioxide, including both the crystalline and amorphous forms of silica. While amorphous silica can be transformed into crystalline forms by heating to high temperatures (≥870°C), it is only the crystalline forms that are fibrogenic. A fibrogenic dust(e.g. crystalline silica and asbestos) is a dust which, after deposition in the gas exchange region of the lung, causes increase of fibrotic (scar) tissue. With dust of this kind, only particles which are capable of penetrating to this region of the lung are of concern in determining the hazard to health. The TWA exposure standards for some forms of silica are:

Quartz:	0.2 mg/m ³
Cristobalite	0.1 mg/m ³
Tridymite	0.1 mg/m ³ .

20.1.1 Control measures

Levels of dust can be minimised by:

- high standards of housekeeping
- covered conveyors and transfer points
- local exhaust ventilation
- a *No Smoking* policy particularly for control rooms
- provision of PPE
- training and supervision.

Reclamation or de-baling of stored bagasse can generate significant levels of airborne dust and spores. Control measures appropriate for these operations include:

- involving the minimum number of workers
- conducting the activities only when weather conditions are suitable
- providing air conditioned cabins on machinery used for these activities
- providing suitable class P2 respirators (minimum) and goggles to workers.

20.1.2 Review

Depending on the degree of risk, periodic reviews of the following may be warranted:

- health checks of workers normally involved in activities generating levels of atmospheric contaminants that may exceed exposure standards;
- identification of sources of dusts;
- assessment of measures to minimise the generation of dusts;
- site inspections to assess housekeeping standards;
- suitability and use of PPE provided.

20.2 Fumes and gases from welding and cutting

The fumes and gases arising from welding and cutting processes may contain a number of hazardous substances. The welding/cutting arc may cause reactions which produce oxides of nitrogen, carbon monoxide and other gaseous contaminants. The intense ultraviolet radiation emitted from some arcs may also give rise to significant quantities of ozone.

The composition of the fume depends upon:

- Consumables: electrodes or filler metals, heating or shielding gases and fluxes;
- Material: chemical composition of material being cut or welded and of any protective coating (eg. galvanising) or primer paint, (eg. lead-based paints); and
- Operating conditions, for example, temperature, current.

The amount of fume generated depends on:

- Process and thermal conditions, for example, amperage, voltage, gas and arc temperatures and heat input which may also vary with the welding position and degree of enclosure and the degree of skill to the welder;
- Consumables;
- Materials; and
- Duration of welding or cutting.

Technical Note 7 produced by the Welding Technology Institute of Australia should be consulted for detailed information on fume generation and control.

When assessing the risks associated with a particular welding or cutting process, consideration should be given to airborne concentrations of toxic metals, such as chromium and nickel, that may be generated from the parent metal or electrode. In addition to complying with the individual exposure standards for specific contaminants, the fume concentration in the breathing zone (which is inside a welders helmet when a helmet is worn) should not exceed 5mg/m³ TWA.

20.2.1 Control measures

When selecting appropriate control measures it is appropriate to identify routine tasks. Generic procedures incorporating suitable control measures can be developed and documented for future use. Such tasks include:

- Roller arcing;
- welding and cutting in dedicated workshop areas; and
- rail line maintenance.

Special consideration is also required for specific tasks such as:

- hot work in confined space (see also section 14.4);
- welding in open spaces; and
- tasks involving stainless steel, galvanised steel etc.

An example of a safe work procedure for roller roughening is given in figure 20.1.

20.3 Ventilation

A workplace where airborne contaminants hazardous to the health of workers are generated must:

- have air quality acceptable to the standard specified in AS 1668.2 when mechanical ventilation is introduced
- have exhaust appliance systems which prevent or minimise the risks from exposure to those airborne contaminants.

Ventilation systems are of two types. When the airborne contaminants comprise low to moderately toxic materials generated only in small amounts, general forced dilution ventilation, either as supplied air or as extracted air systems complying with AS 1668.2, can be employed.

Where airborne contaminants are generated in moderate to large quantities or comprise toxic or very toxic materials, a local exhaust ventilation system is to be employed for which AS 1668.2 may be used for initial guidance. In either case, the exhaust appliance in use must be capable of reducing the level of airborne contaminants such that an involved worker's exposure is not more than the relevant exposure specified in the *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*. In no case is an air-conditioning system considered to be suitable for control of atmospheric contaminants.

20.4 Lighting

This section is under review

20.5 Floor surfaces

Floor surfaces in sugar factories can experience conditions favourable for corrosion particularly concrete surfaces. When spilt onto surfaces, many of the process streams can significantly reduce the friction between the surface and the soles of footwear. Some process additives such as flocculant are particularly notorious. Conversely, some are quite sticky and hinder movement. Injuries can occur from slips, trips and falls.

20.5.1 Control measures

Appropriate control measures include:

- prevent spillages;
- exclusion zones to limit the number of workers in a particular area;
- identified walkways for through traffic;
- application of non-slip coatings in high risk areas;
- fitting of non-slip edging to steel treads of steps;
- design of surfaces to encourage drainage;
- maintaining clean and tidy workplaces;
- maintaining surfaces in good condition;

- regular cleaning of surfaces and quick removal of spills; and
- provision of non-slip footwear.

20.6 Access (Walkways, stairways and ladders)

Australian Standard 1657 sets out requirements for design, construction and installation of fixed platforms, walkways, stairways and ladders which are intended to provide means of safe access to and safe working at places normally used by operating, inspection maintenance and servicing personnel.

It does not deal with temporary access provisions such as scaffolding, elevated work, platforms, dog boxes etc.

All new installations which are intended to provide means of safe access to and safe working at places normally used by operating, inspection maintenance and servicing personnel shall conform to AS1657.

20.6.1 Control measures

Appropriate Control Measures include:

- Planning approval systems which control all installations are to incorporate reference to the AS 1657 where applicable to ensure compliance;
- Non conforming fixed platforms, walkways, stairways and ladders should be identified through inspections and audits and modified to ensure compliance. Incident investigations may also identify non-conforming platforms, walkways, stairways and ladders.

The risk assessment process should be used to establish a priority list of improvements to modify non-conforming items.

A specific stairways program may be an appropriate means of identifying and rectifying non-compliance. A simple checklist using AS1657 may be developed to assist workers carrying out these inspections.

One indication that stairways and access ways etc do not comply to the AS1657 is that they are awkward and uncomfortable to use.

20.7 Ergonomics

This section covers associated ergonomics factors that should be taken into account in the design of plant and equipment in the planning and allocation of tasks in the work environment.

The work environment should be comfortable, healthy and safe in order for the human body to achieve optimum performance. The work environment includes, the workers general work area(s), specific work station(s), material, tools, equipment and also includes such factors as ventilation, vibration, noise, lighting, heat, humidity and air quality.

20.7.1 Recommendations

Ergonomic factors must be considered and taken into account to eliminate or minimise the risk of injury or illness, subsequent to improving productivity, when carrying out:

- task planning and allocation;
- modifications to equipment, work practices, etc.; and
- new projects design and construction:

Ergonomic risks should be identified, assessed, controlled, and reviewed, this should be done in consultation with the worker(s) involved.

When identifying the risks, musculoskeletal injury, incident reports and investigations are an important source of information. When assessing the risks, other factors to take into consideration are, how people communicate with one another, how people see, hear, understand, learn, individual differences through age, fitness, gender, intellectual and physical characteristics of humans.

The design phase should consider risk factors including worker posture, extremes of joint range, fatigue, mobility, and balance. It also includes weight, force and precision requirements of the job.

The ergonomic assessment of tasks should include factors such as working postures, workstation layout, actions and movements required by the task, the materials, equipment, layout of equipment, experience and skill of the worker.

Control measures should be selected from a combination of:

- redesigning the equipment or work practices, for example, changing the process to remove the need for continuous actions;
- redesigning the equipment or the system of work in order to substantially reduce the risk, for example, by using job rotation;
- providing and maintaining any device that will assist workers to carry out their tasks without risk of injury, for example use of a balancer to suspend a tool.
- providing training in methods of carrying out the task to reduce risk of injury;
- providing a combination in some jobs by redesigning some parts and providing mechanical aids.

Examples of factors that may be considered to minimise risk to health and safety include:

- redesign tasks requiring repetitive and prolonged grasping, holding, lifting, pushing or moving of tools or materials
- securing work by jigs, vices or relocating controls
- eliminate or minimise reaching movements from the task, such operations cause fatigue
- provide arm rests or elbow rests to eliminate or minimise prolonged arm suspension for tasks
- redesign tasks to enable arms to be lowered and kept close to the body
- provide tall stools or stand-seats at standing workstations to reduce the postural strain, enabling workers to occasionally vary positions from standing for extended periods
- provide vibration dampening devices, such as rubber grips, on vibrating and pneumatic tools
- provide adequate rest periods between work periods

All workers should be adequately trained in ergonomic factors to identify risks as they arise and enable them to work safely. Training in sound work practices should be conducted as required and appropriate records of training kept.

Obtain the assistance of an occupational health and safety professional where a risk identification has indicated that further risk analysis is required to determine appropriate controls for the health and safety of workers.

20.8 Outdoor sun exposure

Worksafe Australia has issued a *Guidance Note for the Protection of Workers from the Ultraviolet Radiation in Sunlight*. The introduction to this publication succinctly summarises the problems with outdoor sun exposure.

“The prevention of skin cancer in Australia has been given a high priority because:

- Australia has the highest incidence of skin cancer in the world; and
- two out of every three Australians living to the age of 75 can expect to develop some type of skin cancer.

Prolonged exposure to sunlight is well established as the major cause of skin cancer in Australia. It is the ultraviolet (UV) radiation component of sunlight which is harmful; this can occur even on cloudy days. Sufficient exposure to be harmful can be a year-round problem in Queensland.

Several factors contribute to an increased risk of developing skin cancer:

- working in outdoor areas resulting in increased exposure to solar UV radiation e.g. truck drivers, gardeners, riggers/doggers, forklift operators, locomotive drivers and assistants, gangers;
- because of higher solar UV exposures, the closer people live to the equator, the more likely they are to develop skin cancer;
- solar UV radiation intensity increases with height above sea level;
- solar UV radiation is at its greatest intensity between the hours of 10.00am and 2.00pm;
- the risk of skin cancer is greatest in people with fair complexion, blue eyes and freckles, who tan poorly and burn easily, but others are also at risk;
- there is an increased risk in people who have already had a skin cancer or keratosis diagnosed.

While certain skin types are associated with an increased risk, it is important that everyone should protect their skin from prolonged exposure to solar UV radiation, regardless of skin types.

In addition to skin cancer, solar UV exposure is a major cause of eye damage including photoconjunctivitis and photokeratitis, cataracts and pterygia.

Even intermittent exposure to solar radiation can be harmful. Those who work outdoors part-time are still at risk.

Measures to minimise exposure to solar UV radiation need to be incorporated into work activities.

20.8.1 Recommendations

It is recommended that mills adopt a job safety practice with respect to reduction of sun exposure to workers. The job safety practice is considered more compelling on employees to adopt than a policy. The Queensland Cancer Fund has published a document called *Sun Safety at Work - Policy Guidelines*. This booklet outlines the basic steps, which should be taken to develop and implement a policy and procedures for sun safety. These procedures are also applicable to a job safety practice, and include:

- a policy statement (appendix B provides a sample policy statement);
- steps to be taken to implement and promote sun safety;
- recommended personal protective equipment and other measures (e.g. providing shade, wearing sunscreen and long sleeve shirts and trousers where appropriate) to introduce to reduce exposure;
- an education module for employees; and
- case studies of successful implementation.

Mills should use a risk management approach (see section 6 of this code on risk assessment) to identify workers who are at risk from sun exposure (UV radiation). Training of workers at induction and periodically could include self-screening for skin cancer; nature of exposure to UV radiation and its effects; and protection and control measures.

20.9 References

National Occupational Health and Safety Commission (1995). *Exposure standards for atmospheric contaminants in the occupational environment* [NOHSC:1003(1995)], AGPS.

Standards Australia.

AS 1259.1 Acoustics - Sound level meters.

AS 1269 Acoustics - Hearing conservation.

AS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation.

AS 1668 The use of mechanical ventilation and air-conditioning in buildings.

AS 1680 Interior lighting.

AS1837 Code of Practice for the Application of Ergonomics

AS 2293 Emergency evacuation lighting for buildings.

AS 3853.1 Fume from Welding and Allied Processes Part 1: Guide to Methods for Sampling and Analysis of Particulate Matter.

AS 3853.2 Fume from Welding and Allied Processes Part 2: Guide to Methods for the sampling and Analysis of Gases.

Workplace Health and Safety Regulation 1997 Parts 10 & 11.

Workplace Health and Safety (Asbestos removal) Advisory Standard 1996.

Workplace Health and Safety (Manual handling) Advisory Standard, 1991

Workplace Health and Safety (Manual handling in the Building Industry) Advisory Standard, 1991

Workplace Health and Safety (Noise) Advisory Standard, Reprint No. 1, 1996.

Workplace Health and Safety (The selection, provision and use of personal protective equipment) Advisory Standard 1991.

Workplace Health and Safety (Workers, employers and noise at work) Brochure BRO004, 1996.

Workplace Health and Safety (The safe treatment, removal and disposal of asbestos-cement sheeting and asbestos coated metal sheeting) Advisory Standard 1993.

Workplace Health and Safety (Work Involving Repetition, Force or Awkward Postures) Advisory Standard, 1996.

Welding Technology Institute of Australia, *Technical Note 7 Health and Safety in Welding*, Sydney, 1994.

Dept. of Education, Training and Industrial Relations. *Is your skin ready for the Sun?* and *Solar UV Radiation and Employers*

Queensland Cancer Fund. *Sun Safety at Work - Policy Guidelines*.

Worksafe Australia. *Guidance Note for the Protection of Workers from Ultraviolet Radiation in Sunlight*.

ASMC Draft policy on Sun Protection.

Figure 20.1 Example: Safe work procedure for roller arcing (page 1 of 3).

SAFE WORK PROCEDURE				
DEPARTMENT: Engineering		SECTION:		CURRENT
TASK/JOB: Roller arcing (Shutdown and pre-season)				PAGE 1 OF 3
				REF:
REASON FOR SWP:		SWP APPROVED BY:		DATE:
DATE OF REVIEW:		BY WHO:		ISSUE:
		OUTCOME: REVISE SWP <input type="checkbox"/>		REVISE RISK ASSESSMENT <input type="checkbox"/>
TOOLS REQUIRED	SAFETY EQUIP	PERSONNEL REQ	OTHER JOB REQ	PREPARED BY
A Welding machine	1 Welding helmet	Boilermaker.	Crane required to move the fan between top and bottom roller.	
B Tin for rods and butts.	2 Welding gloves.	Offsider.	Use an air supplied hood if	
C Bar for front roller.	3 Leather jacket.			
D Water hose (hot).	4 Goggles (snow goggles)		with	
E Electric fan (HD)	5 Fume mask		snow goggles as minimum	
F Water hose (cold)	6 Emergency trip		requirement.	
G	7 Balaclava.			
H	8 Work gloves.			
I	9 Isolation equipment.			
J	10			
K	11			
L	12			

Figure 20.1 Example: Safe work procedure for roller arcing (page 2 of 3).

SAFE WORK PROCEDURE					
DEPARTMENT: Engineering		SECTION:		CURRENT	PAGE 2 OF 3
TASK/JOB: Roller arcing (Shutdown and pre-season)					REF:
REASON FOR SWP:		SWP APPROVED BY:		DATE:	ISSUE:
DATE OF REVIEW:		BY WHO:		OUTCOME:	REVISE SWP <input type="checkbox"/> REVISE RISK ASSESSMENT <input type="checkbox"/>
SPECIFIC JOB STEPS	TOOLS REQ.	SAFETY EQUIP.	HAZARDS	HAZARD CONTROLS	OTHER INFO
1 Open up mill					Check with mill fitter
2 Lock and tag carrier above		9	Bagasse falling from carrier above	Isolate carrier	
3 A Side only:- Isolate Biocide dosing pumps (2). Situated at A2 cane carrier and A4 mill, process		9	Exposure to Biocide	Be sure to isolate.	when spotting completed, remove isolation and turn switch to on
4 Clean up area	D	8	Hot water	Take care of others	
5 Set up crossbar					
6 Set correct power and run out leads completely and shorten to minimum length					240 To 250 amps.
7 Earth lead clamp to be attached to roller to be spotted or common earth strap where provided					A5 ,B5& B1 Mills earth clamp to be attached to earth provided for roller spotting
8 Set up fan (suction if available)	E	8	Power lead	Suspend lead 2m above ground	Fan is optional it can circulate C.I. dust
9 Put on required welding equipment	A	1 TO 7			Darker than normal welding lens required, 13 or 14 minimum
10 Offsider to set up emergency trip switch close to boilermaker and safety cover removed		6			Boilermaker must keep emergency trip switch near him at all times
11 Set up hose to wet roller being spotted	F	8	Cast iron dust can be generated if roller becomes dry	Continuous wetting of roller by setting up a hose on top roller	Ensure roller surface is kept wet. At A5 wet both pressure feeder roller and feed roller

Figure 20.1 Example: Safe work procedure for roller arcing (page 3 of 3).

SAFE WORK PROCEDURE						
DEPARTMENT: Engineering		SECTION:		CURRENT		PAGE 3 OF 3
TASK/JOB: Roller arcing (Shutdown and pre-season)						REF:
REASON FOR SWP:			SWP APPROVED BY:		DATE:	
DATE OF REVIEW:		BY WHO:		OUTCOME: REVISE SWP <input type="checkbox"/> REVISE RISK ASSESSMENT <input checked="" type="checkbox"/>		ISSUE:
SPECIFIC JOB STEPS	TOOLS REQ.	SAFETY EQUIP.	HAZARDS	HAZARD CONTROLS	OTHER INFO	
11 Spotting can commence	A to F	1 TO 7	Area can be slippery	Approach with care		
	A,B,C,E	1 TO 7	Rods can stick to roller	Break contact and check amps		
12 When finished spotting roller, and removing helmet etc. care should be taken that C.I. does not enter eyes	F	4,	C.I. dust in eyes	Use goggles. Care should be taken when removing PPE. It is a good idea to brush down with a rag before removing.	This will cut down the risk of C.I. dust to the eyes	
					Eyes must be checked at first aid when finished each roller or removal of equipment or every two hours. Eye checks for T/A	
13 T/A to clean and roll up equipment after spotting is completed					Tradesman to check	
14 Cross bars that are not permanently fixed are to be removed and stacked against the nearest column					Tradesman to check	

21 Not Allocated

PART 5. TRANSPORT HAZARDS

22 Road safety

This section covers the requirements associated with road safety and the prevention of road accidents involving vehicles owned or used by mill employees for activities associated with milling operations. It includes qualification of drivers, maintenance of vehicles, training and accident reporting.

The aim is to ensure that all vehicles owned or used by mills are used and operated safely to prevent or minimise the risk of accidents.

22.1 Recommendations

The following recommendations are made.

- All vehicles owned or used by a mill shall be registered or covered by a road permit and all drivers shall hold a current driving licence when driving on public roads.
- All vehicles should be equipped with a first aid kit and fire extinguisher appropriate to the intended use of the vehicle.
- All vehicles should be regularly inspected and maintained in a roadworthy condition. Any safety deficiencies detected shall be repaired before further use. This should include verifying compliance with noise and emission regulations.
- Any vehicle accident, whether resulting in injury or not, should be reported immediately and investigated.
- If the vehicle is to be used in remote locations by a single driver, an appropriate form of communication should be fitted to the vehicle and maintained in a serviceable condition. Suitable communications equipment may include radio and/or mobile phone.

23 Cane & sugar transportation

23.1 Cane Road Haulage Equipment

This section covers the requirements associated with cane road haulage equipment owned and/or operated by a milling company. It aims to ensure that this equipment is operated and maintained in a safe manner so to ensure the workplace health and safety of employees and others.

23.1.1 Recommendations

The equipment shall be serviced and maintained to at least the manufacturer's specifications. Records shall be maintained on all servicing and major maintenance.

Operators are to be trained and qualified to operate the equipment. Where use of the equipment is seasonal or an operator does not operate the equipment for an extended period (e.g. 6 months), the mill should ensure the competency of the operator at the start of the operational period and the assessment recorded.

Where the equipment is interfacing with other transport systems, radio or mobile phone communications should be available and the operators trained in the correct procedures for using the communications equipment.

Operators shall follow the rules set down by the Department of Transport *Traffic Act and Regulation* and the mill's safe work practices.

It should be remembered that these vehicles are classified as heavy vehicles and the operator must not operate them while under the influence of alcohol or prohibited drugs. Some prescribed medications and drugs can cause drowsiness and affect co-ordination. Operators should seek medical advice about the effects of the medication or drugs before operating any of these vehicles.

24 Interaction with others

24.1 Motoring public

This section covers the requirements associated with the cane railway system and its interacting with the motoring public. The aim is to ensure that all precautions are taken to minimise the risks associated with the interaction of cane trains with grower's equipment, harvesters, haulouts and public vehicles.

24.1.1 Recommendations

All operators of vehicles that operate on the industry's cane rail system must be trained and competency tested. The training and the results of the competency test should be documented. Where employment is seasonal, management should ensure the competency of operators prior to their employment commencing in each season and the assessments recorded.

All operators of vehicles that operate on the cane railway system shall use the safe work practices set out in the *Safe Operating Practices for Cane Railways*. These include:

- ensure efficient communication by following the correct radio procedures;
- dipping the lights where the glare may affect others;
- reporting defective traffic lights;
- sounding the horn for all situations required by mill practices;
- minimising delays at road crossings;
- flag a warning to approaching traffic when shunting on or near road crossings;
- reporting back to base any animals, obstacles and/or people on or near the train lines or bridges;
- reporting back to base any near misses at road crossings;
- know the emergency procedures in case of an accident; and
- zero blood alcohol levels for the traffic officer, locomotive driver, assistants and crew member. (See also 35.1.1).

A reporting system shall be in place to report any incidents which caused or may have caused an injury and/or damage.

Educational programs should be conducted at schools to emphasise the risks associated with locomotives and riding on cane bins.

Milling districts should ensure public awareness of the risks associated with unauthorised interaction with the cane railway system through using appropriate media.

24.2 Harvesting contractors and haulout operators

This section covers the requirements associated with the interaction of growers, harvester contractors and haulout operators interacting with the cane rail system. This includes where they are working beside the line, where they cross the line and at the sidings where they deliver the cane.

The aim is to ensure that procedures are in place and are communicated to growers, harvester contractors and haulout operators to minimise the risk associated with this interaction.

Land used for cane railway lines and sidings is a workplace for mill employees and the mill is considered to be in control of the workplace for the purposes of the *Act*. As such, the mill has an obligation to ensure that the condition in which the workplace is maintained and the activities carried out at that workplace by mill employees, do not present a health and safety risk to employees, and others who have a bona fide right to be there.

Growers and harvesting contractors are ‘others’. When they are working at the siding, it becomes a workplace to them and they have an obligation to ensure that the way they carry out their activities does not pose a risk to themselves, mill workers and others.

Growers have an obligation to conduct a risk assessment to identify hazards at the siding and elsewhere along the line and develop procedures to eliminate the risk associated with the hazard. For example, if the hazard is an embankment that presents a roll-over hazard, the grower may:

- Remove the hazard if not on an easement eg access; and/or
- If on an easement, request the mill, as controller of the workplace (siding) to remove the hazard; or
- ensure that all tractors used in the area are fitted with ROPS and seat belts and the drivers are advised how to approach the hazard; or
- request the mill to relocate the siding.

If it is not feasible for the mill to reduce the hazard, the mill may have to direct that all tractors using the siding be fitted with a ROPS.

In the event of an incident at a siding, the questions to be considered include:

“Did the mill, as controller, take all reasonable steps to maintain the siding in such a condition that it would not present a hazard to users?”

“What steps did the mill take to inform growers/contractors of the possible risks associated with using the siding and what steps did the growers/contractors take to address the risks?”

“What steps did the grower/contractor take to assess the risk, inform workers and reduce or eliminate the hazard?”

24.2.1 Recommendations

Each mill should have standard work procedures for work performed at cane railway sidings.

Cane railway crews shall follow the procedures in the *Safe Operating Practices for Cane Railways* as a minimum standard.

Meetings with growers, harvester operators and haulout contractor should be arranged before the start of each crushing season to discuss safe work practices.

Mill representatives and miller/grower committees should meet regularly to discuss risks associated with the interaction of the farm operation and the cane railway system. Discussions would include:

- working near the cane railway system;
- crossing cane railway lines;
- working at the cane railway sidings;
- communicating with locomotive crews at the siding;
- keeping the area clean and tidy; and
- reporting any accidents involving the cane railway infrastructure to the mill cane inspectors, cane railway maintenance crews and/or train crew.

These standard work procedures should be published in booklet form and made available to growers, harvester operators and haulout contractors at the start of each crushing season.

24.3 Reference

ASMC (1996). *Safe operating practices for cane railways*.

ASMC/SRI (1998). *Code of practice for cane railway operations*. Draft.

25 Transport of hazardous substances

This section sets out to ensure the control of activities associated with transportation of materials which may constitute an environmental, safety or health hazard, whether done by mill personnel or contractors. It deals with the risks associated with the transport of products and materials which constitutes or may constitute a hazard.

The specific risks would include the health and safety of the drivers and other road users, the community along transport corridors and others who may be affected. The control may include:

- the selection of creditable carriers;
- the selection of competent drivers where the mill is transporting hazardous substances;
- training;
- risk reduction measures; and
- incidents and emergency response.

25.1 Recommendations

Written procedures should be developed to address the specific risks associated with the transport requirements (e.g., oxygen, acetylene, caustic soda, lime, etc.).

The transport of hazardous substances shall comply with all legislative requirements. The vehicles shall have the required registration and the driver the required licence.

A system for the selection and accreditation of transport carriers could be established.

Carriers should be instructed on the expected performance standards and the mill procedures and instructions related to transport loading and unloading, training of drivers, accidents, emergency response and reporting.

The transport of hazardous wastes by a mill shall be in accordance with the mill's environmental licence and the ADG Code.

All transport accidents are to be immediately reported and investigated as per the site policy and procedures.

An emergency response plan to deal with hazardous substance emergencies during unloading operations should be prepared as part of the mill's emergency response plan. All mill drivers should be fully versed in the emergency plan's details.

25.2 References

Dangerous Goods Act
Dangerous Goods Regulations
Environmental Protection Act
Explosives Regulations
Liquefied Gases Transfer Regulations
Transport Regulations

Federal Office of Road Safety (1996). *Australian code for the transport of dangerous goods by road and rail (ADG code)*. 6th ed., AGPS.

Standards Australia:

AS 1678 Emergency procedure guide - transport.
HB76: Dangerous goods - Initial emergency response guide.

PART 6. AGRICULTURAL HAZARDS

Note: Part 6 applies to milling companies who also conduct farming operations. It is not intended to place any responsibility on mills to ensure that growers adhere to this part.

26 Farming practices

26.1 Tractors and Implements

An integral part of the sugar industry is the machinery used in the production of the raw material, the sugar cane. Every farm has a number of tractors and a range of implements used for the cultivation of the crop. Unfortunately, these important tools of trade for the cane grower have been the cause of injury or death to persons working in the industry.

26.1.1 Hazards

The hazards associated with working with tractors and implements include:

- entanglement in moving parts;
- tractor run-overs; and
- tractor roll-overs.

26.1.2 Control measures

The controls available to eliminate the risks associated with the hazards include:

Engineering controls:

- ensure that all moving machinery and machine parts are guarded to prevent entanglement;
 - guards on power take off (PTO) shafts;
 - enclose chains, gears etc.;
- fit all tractors with roll-over protective structures (ROPS) that conform to AS 1636;
- fit and use seat belts;
- ensure steps on to tractors and machinery are not slippery; and
- provide hand grips/ holds to assist operators when getting on or off machinery.

Administrative controls:

- do not allow passengers to ride on tractors or implements unless there is a seat provided;
- provide training to workers on the operation of tractors and implements; and
- provide workers with information on risk assessment in the work situation.

Personal protective equipment:

- safety footwear with non slip soles should be worn by equipment operators; and
- hearing protection should be provided where sound insulated cabins are not provided; and
- provide respiratory protection where filtered air cabins are not provided and dusty conditions prevail.

26.1.3 Recommendations

Tractors are a source of potential harm to people working in the sugar industry. It is an accepted fact that ROPS combined with seatbelts will reduce the potential for injury or death in roll-over incidents. It is strongly recommended that every tractor in use within the industry be fitted with a ROPS. Secondly, it is recommended that all implements powered through a PTO shaft be fitted with guards to prevent entanglement in the rotating shaft. This is particularly important in the case of static pumps and water transfer equipment such as winches.

26.2 Harvesting operations

The harvesting of sugar cane is a task, which presents particular hazards. Often the work may commence and be carried out in the hours of darkness. The people engaged in the work may be contractors as well as employees. The farm owner has an obligation to ensure that the environment of the farm does not present a hazard to the people involved in the harvesting operation.

26.2.1 Hazards

The hazards associated with harvester operations include:

- roll-over of harvesters;
- proximity of roads, drains and ditches;
- proximity of haulouts and cane trains;
- entanglement with power lines;
- entanglement with moving parts;
- noise;
- projectiles being thrown from moving parts;
- night harvesting;
- extended work hours;
- dust; and
- extended work hours.

26.2.2 Control measures

Some of the controls available to eliminate the risks associated with the hazards are:

Engineering controls

- ensure that all moving parts, pinch points, chains and cogs are guarded;
- provide enclosed sound insulated cabins;
- provide guards at base cutters;
- fit adequate lighting to vehicles; and
- provide filtered air supply to cabins.

Administrative controls

- provide information to operators on risk assessment in the work situation;
- provide training on hazards associated with overhead power lines. (Look up and live); and
- ensure that headlands and paddocks are not too steep for harvesters.

Personal Protective Equipment

- safety footwear with non slip soles should be worn by equipment operators;
- hearing protection should be provided where sound insulated cabins are not provided; and

- provide respiratory protection where filtered air cabins are not provided and field conditions are likely to generate dust.

26.2.3 Recommendations

To minimise the risk from hazards associated with harvesting operations, it is important that the environmental hazards be reduced. It is recommended that an assessment of the risks be conducted and that all persons involved in the work be made aware of the hazards and what steps are to be taken to address the hazards.

26.3 Haulout operations

The transportation of sugar cane from the field to the point where transportation on mill assets commences can be over land which belongs to the growers, on public roads and on land controlled by the mill, e.g. cane rail sidings. Hazards associated with equipment and work procedures have the potential to impact on employees, the general public, mill management and the grower.

26.3.1 Hazards

The hazards associated with haulout operations include:

- roll-over of equipment;
- run-over by equipment;
- proximity of roads, drains and ditches;
- proximity of harvesters and cane trains;
- entanglement with moving machinery;
- strain / sprain injuries;
- slip / trip / fall hazard;
- noise; and
- dust.

26.3.2 Control measures

Some of the controls available to eliminate the risks associated with this hazard are:

Engineering controls

- fit all haulout equipment with ROPS conforming to AS 1636;
- fit and use seat belts;
- ensure access steps to haulout equipment are not slippery;
- provide hand holds / grips to assist operators in accessing and alighting from equipment;
- ensure any moving parts, pinch points, chains and cogs are guarded;
- provide winches, tractors or manual handling aids to assist in moving bins in roll on roll off (RORO) operations;
- maintain appropriate gradients at RORO sites to assist with control of bins; and
- maintain cleanliness of traffic indicator lights.

Administrative controls

- provide information to all operators on risk assessment in the work situation;
- provide training on manual handling procedures for moving bins in RORO operations; and
- ensure work areas are clear of any debris which would present a slip / trip / fall hazard.

Personal protective equipment

- all haulout operators should wear safety footwear with non-slip soles;
- hearing protection should be provided where sound insulated cabins are not provided; and
- respiratory protection should be provided where filtered air cabins are not provided.

26.3.3 Recommendations

Once again, because of the predominant use of tractors as prime movers in the haulout operations, it is recommended that all tractors be fitted with ROPS. Where bins are transferred to the cane rail system using a RORO system, there is the potential for strain / sprain injuries and slip / fall hazards. To address these issues it is important that risk assessments be conducted on all haulout operations.

26.4 Licences

Management has an obligation to ensure that all people operating machinery and equipment are competent to operate that equipment. The Queensland Department of Transport is responsible for the issue of licences to operate vehicles on public roads and Department of Employment, Industrial Relations and Training (DETIR) is responsible for the issue of certificates to operate plant at a workplace. Certificates issued by these agencies show that the operator was deemed to be competent at the point of assessment. Even when a worker has a certificate or licence, employers should satisfy themselves that the worker is competent to operate the equipment.

The class of licence required to operate vehicles is as follows:

Rigid body truck	MR or HR
Tractor trailer combination	UD or HC
Harvester	UD or HR

The class of certificate required to operate plant equipment is as follows:

Front end loader	LL	
Front end loader/ backhoe	LB	
Excavator	LE	
Dozer		LZ
Scraper	LP	
Forklift	LF	

The *Act* and *Regulation* provide exemptions for workers employed on rural properties to operate plant equipment without a certificate. Management must be satisfied that the worker is competent to operate the plant.

26.5 Maintenance

Within farming operations, the maintenance of plant and equipment is one of the tasks regularly carried out by growers and/or their workers. The hazards associated with maintenance tasks are similar to the hazards associated with most mechanical or engineering workshops.

26.5.1 Hazards

Hazards associated with maintenance work on farms include:

- electrocution;
- burns;
- hazards associated with electric and gas welding;
- hazardous substances;
- strain / sprain injuries;

- slip / trip / fall hazards;
- working at heights; and
- working in confined space.

26.5.2 Control measures

Some of the controls available to eliminate the risks associated with these hazards are:

Engineering controls

- use only double insulated electrical equipment. Ensure an approved safety switch protects all power circuits;
- construct a suitable facility for storage of flammable liquids;
- provide adequate fire fighting apparatus;
- provide manual handling aids such as cranes or pulleys to assist in lifting tasks;
- carry out all welding work in an area specifically prepared for the task; and
- ensure all hazardous substances are securely stored.

Administrative controls

- ensure all workers have been trained on the correct method of manual handling;
- maintain good house keeping within the workshop and ensure that all tools and equipment are stored in a manner that will not present a hazard to workers;
- ensure that all workers have been advised of the risk when working at heights and that they have been provided with some method to prevent falls from heights;
- ensure all workers involved in confined space work are adequately trained and that the requirements of the Australian standard are followed; and
- maintain records on holdings and use of hazardous substances.

Personal protective equipment

- provide adequate personal protective equipment to protect workers from the hazards associated with maintenance work.

26.5.3 Recommendations

In order to ensure that workers and growers are not exposed to the risks associated with maintenance work on farms a risk assessment should be conducted of all tasks carried out on the farm and adequate measures taken to minimise the exposure to the hazards.

26.6 Records

One of the most important aspects of risk management on the farm is the maintenance of good records. It is recommended that records be kept of the following:

- employee induction;
- specific employee training;
- certificates and licences held by the worker;
- maintenance records for equipment;
- usage records for hazardous substances;
- record of PPE provided to workers;
- record of risk assessments conducted on farm work procedures; and
- record of injuries at the workplace.

26.7 References

Standards Australia. AS 1636 Tractors – Roll-over protective structures – Criteria and tests.

Workplace Health and Safety (The safe design and operation of tractors) Advisory Standard.

Workplace Health and Safety (Rural plant at a rural workplace) Advisory Standard.

27 Not Allocated

Part 7. ADMINISTRATIVE ISSUES

28 Shiftwork

When a manager introduces a work process, there is a obligation to take practicable precautionary measures to protect the health and safety of employees. Just as there are hazards arising from exposure to machines or hazardous substances which need to be addressed as part of these precautionary measures, there are also hazards associated with working late and/or long hours. These hazards should be considered when designing work schedules and programs so to minimise any unwanted effects on the physical and psychological well-being of workers.

Workers should also exercise their obligation by being aware of and minimising the potential health and safety consequences of shiftwork.

The DETIR publications *Managing shiftwork* and *Hints for shift workers* provide useful information for both management and workers.

28.1.1 Recommendations

These recommendations relate to the overall shift roster, not individual circumstances which may occur due to manning availability in the factory.

In the current industrial relations climate existing shift rosters are set and varied through a variety of established systems such as Awards, Certified Agreements and facilitative/consultative arrangements. During the consultation stages of changing or setting up new shift rosters, the following recommendations should be considered to minimise the adverse effects of shiftwork.

- *Length of Work Cycle.* A work cycle is the number of successive days of rostered duty. It is recommended that work cycles of more than seven continuous working days be avoided.
- *Frequency of Rotation.* It is recommended that the number of nights worked in succession be limited.
- *Direction of Shift Rotation.* It is recommended that shifts rotate toward later times in a forward or clockwise direction. It is easier for people to delay sleep than to go to bed earlier.
- *Duration of Shifts.* It is recommended that the acceptable length of a shift should be governed by the type of work performed. Long shifts for example are best avoided where there is excessive heat, cold, noise, vibration, manual handling or exposure to hazardous substances. Occupational exposure levels are calculated as an average over an eight hour day. When working longer shifts, exposure levels will need to be reassessed.
- *Overtime.* It is recommended that shifts with overtime built in to them be avoided except in exceptional circumstances. It is also preferable that overtime be avoided before or after a night shift. Overtime should not be worked in conjunction with 12-hour shifts. Double shifts should be avoided.
- *Meal Breaks.* Where practicable, a meal break or breaks should be scheduled during night shift to help employees maintain alertness.
- *Information and training.* It is recommended that employees have access to appropriate information and training to ensure work can be performed safely, irrespective of the time of their shifts. Special arrangements may be required to hold training courses at times suitable for shift workers.

- *Access to emergency services.* Shiftwork may introduce difficulties in accessing emergency facilities, due to a reduced access to emergency services after hours. Information on how to reach help should therefore be provided with this in mind. All employees are to have access to first-aid equipment. At least one person on each shift should be a competent first aider.
- *Education in self-care.* Understanding how shiftwork affects the body clock, alertness, health and social life, helps employees cope with shiftwork. It is therefore recommended that management provides employees with adequate information for self-care on matters related to coping with and facilitating adjustment to rotating and/or night shiftwork. This information is available through the Div. WH&S or ASMC and addresses such things as advice on minimising sleep loss and fatigue, keeping nutrition in balance with the sleep/work cycle and general health matters.
- *Health Surveillance.* Shiftworkers need to have the same or perhaps even greater access to occupational health services, periodic medical examinations, health counselling and advice on health care as day workers. It may therefore be necessary to make arrangements to change shifts so medical attention can be sought during regular day hours. Pre-placement health assessments are desirable before starting shiftwork, as this may help identify potential health problems and assist in the long term monitoring of the health effects of shiftwork.

A recognition of the effects on shift workers' lives, particularly of night work and rotating shiftwork has grown over the past decade. This recognition has highlighted a need to help employees adjust and cope with shiftwork. The wide variety of individual, domestic and industrial circumstances make it difficult to define the "best" way of organising the working time of shiftworkers in order to meet both the demands of production and the needs of the workers.

Although it is impossible to eliminate all adverse effects of shiftwork, the improved health and safety of shift workers should be a realistic goal by reducing the number of incidents and accidents in which fatigue and lack of attention to detail play a part.

28.1.2 Reference

Division of Workplace health & Safety *Managing Shiftwork* and *Hints for Shift workers*.

29 Certificates for prescribed occupations

Within the *Regulation* there is a requirement for operators of specific high risk industrial equipment (stationary and mobile plant) to hold certificates to work in a prescribed occupation.

In line with obtaining certificates is the need for training in a prescribed way and a obligation imposed on a trainee to follow closely the rules to obtain a certificate for the prescribed plant or equipment. The training role of management is also subject to legislative requirement.

There are also specific conditions imposed on the holder of a certificate in relation to the prescribed occupation and in relation to trainees. Learner permits are no longer issued. However, people who are not certificated may carry out work in the prescribed occupation as a trainee under the direct supervision of a certificate holder of the same class as the trainee being trained for. Trainees must keep a written record of training. Log books must be countersigned by the certificate holder providing the direct supervision. Log books are available from DETIR.

29.1 Certificate classes

Prescribed occupations for which certificates are required include:

- scaffolding
- dogging
- rigging
- cranes and hoists
- demolition
- loadshifting
- pressure equipment
- welding
- asbestos removalist

Note: Some certificates in these classes may include basic, intermediate and advanced levels as well as endorsements on existing certificates. Other certificates may have up to ten levels within the class (e.g. welding).

29.2 Recommendations

Mill management should implement a policy and procedures that will:

- enable appropriate employees to possess a certificate to work in a prescribed occupation;
- maintain trainee records and retain a register of certificates; and
- audit certificates as appropriate to ensure currency.

29.3 Reference

Worksafe Australia [NOHSC:7019(1992)] National Guidelines for Occupational Health and Safety Competency Standards for the Operation of Loadshifting Equipment and other Types of Specified Equipment.

Worksafe Australia [NOHSC:1006(1992)] National Occupational Health and Safety Certification Standard for Users and Operators of Industrial Equipment.

30 Registration

30.1 Registration of plant

Under part 2 of the *Regulation* there is a requirement for an employer or owner to register particular types of plant and should that plant not be registered, management is obliged not to use such plant.

The design of plant also requires registration to ensure that the design and construction of the plant is free from risk and will not affect the health and safety of both management and worker.

30.2 Registrable plant

Registrable plant defined in schedule 3 that may be found at a sugar mill include:

- air conditioning units (>50 kW);
- boilers other than coil type forced circulation boilers having a rating less than 1 MW;
- cooling towers;
- cranes other than -
 - (a) cranes having the hoisting mechanism operated by hand power; or
 - (b) cranes having a safe working load less than 5 t; or
 - (c) truck mounted loading and unloading cranes having a moment capacity equal to or less than 10 metre tonnes.
- industrial lift trucks having a capacity of more than 10 t;
- mobile elevating work platforms;
- personnel and material hoists;
- unfired pressure vessels (other than cylinders mentioned in AS 2030) with a capacity greater than 500 L and containing -
 - (a) steam; or
 - (b) gas; or
 - (c) a flammable, poisonous or corrosive fluid.
- vehicle hoists.

Vacuum pans and evaporators are classed as unfired pressure vessels.

[Note: This list has been compiled as being the most applicable registrable plant which may relate to sugar milling operations. Registrable plant is not limited to this list and for further reference review the list given in schedule 3 of the *Regulation*.]

30.3 Recommendations

- management to review the statutory requirements in relation to registration;
- establish a register of plant;
- periodically review the register to ensure plant is correctly registered;
- ensure that the design of plant is registered [as required in schedule 4 of the *Regulation*] if the sugar mill is the manufacturer of the plant.

30.4 Reference

Standards Australia. AS 2030 – *The approval, filling, inspection, testing and maintenance of cylinders for the storage and transport of compressed gasses.*

Standards Australia. AS 1210 – *Pressure vessels.*

Workplace Health and Safety (Plant) Advisory Standard

Workplace Health and Safety Regulation 1997 Part 2 Division 2 – Registration of Registrable Plant.

31 Emergency response planning

Mill management, as an employer or principal contractor has an obligation to ensure the workplace health and safety of employees and others at the workplace. This obligation is extended to the practices and procedures of emergency situations which may include fire, chemical spills, vehicle accidents, medical emergencies and the use of particular emergency/rescue equipment.

31.1 Key points

The key points to consider in any emergency response planning include:

- establishment of procedures to deal with possible emergencies that are identified as a result of the risk assessment process;
- purchase of appropriate emergency/rescue equipment;
- establishment and maintenance of emergency manifests;
- liaison with local emergency services;
- documented practices and procedures;
- training in emergency response.

31.1.1 Recommendations

- conduct risk assessments of identified hazards and possible emergency scenarios;
- prepare emergency plans;
- implement and monitor emergency plans;
- training and liaison with local emergency services; and
- review the plans at regular intervals.

31.2 Hazardous chemical spills

The possibility of a hazardous chemical spill would normally be addressed during the initial planning phase prior to the introduction of the chemical to the workplace.

The seriousness and subsequent response appropriate to the situation will depend on a number of factors including:

- the type and quantity of chemical involved;
- the chemical and physical properties of the chemical;
- proximity to workers, buildings and other chemicals;
- whether the spill is an isolated occurrence or part of a chain of uncontrolled events;
- containment, clean-up and environmental impact; and
- likely consequences.

31.2.1 Recommendations

Following a risk assessment, procedures should be developed to deal with each likely emergency scenario if and when it arises. Emergency situations could involve hazardous chemicals in either the factory or the laboratory. The procedures should address, among other things:

- likely quantity of spillage;
- site of the spillage;

- containment options including any fire water;
- clean-up procedures and disposal;
- evacuation (if required);
- notification to relevant authorities;
- maintenance and storage of emergency manifests to assist the relevant authorities;
- first aid;
- environmental impact; and
- decontamination.

The local authorities, in particular the Qld Fire Service and Chemical Hazards and Emergency Management (CHEM) Unit, may be able to provide advice on the appropriateness of emergency procedures or be involved with the development of such procedures.

Suitable equipment and materials need to be available to minimise the outcome of a possible emergency. Consider the need for:

- safety showers;
- eye wash stations;
- first aid supplies relevant to the likely injuries and illnesses;
- self-contained breathing apparatus and medical oxygen;
- type and quantity of fire extinguishers; and
- absorbents, neutralising materials and clean-up tools.

All emergency equipment should be checked regularly and the checks recorded.

Drill training sessions should be conducted regularly (and recorded) to maintain an appropriate standard of response.

31.3 Waste disposal

The range of wastes generated will depend on the nature of the emergency. Final products of chemical reactions that may occur during a fire are often difficult to predict. Special arrangements may be required to dispose of the wastes generated during the emergency.

31.4 References

Standards Australia. *AS 3745 Emergency control organisation and procedures for buildings*. SAA/SNZ (1996). HB76 – Dangerous goods: Initial emergency response guide.

32 First Aid

Schedule 7 of the Workplace Health and Safety Regulation 1995 paragraph 9 states:

9. A workplace must have first aid equipment and facilities readily available for use

The *Workplace Health and Safety (First Aid) Advisory Standard* provides practical advice about the selection, provision, maintenance and use of first aid facilities and services at a workplace. The advisory standard has 7 sections and 9 appendixes.

The first section is the definitions which refers to the dictionary in appendix 9. The second section describes basic concepts including:

- consultation;
- confidentiality of information;
- record keeping and information about a first aid - an accident plan (this is also applicable to the previous section on emergency planning).

The third section is on first aid requirements. This section practically sets out a risk assessment which is covered under section 22(2) of the *Act*. The areas include:

- Identifying causes of injury and illness. Methods of identifying workplace hazards include:
 - consultation with workers;
 - work process evaluation;
 - a walk-through survey;
 - review of “near miss’ incident, accident and injury data;
 - material data sheets and product labels; and
 - specialist practitioners and representatives.
- Assessing the risk of injuries and illnesses. The following data needs to be determined:
 - the frequency of worker exposure to hazards and causes of injury and illness at work;
 - the duration of exposure; and
 - the potential severity of outcomes.
- Choosing first aid facilities and services. Consideration should be given to:
 - nature of the work;
 - size and layout of the workplace;
 - location of the workplace; and
 - number and distribution of workers.
- Evaluating first aid facilities and services. Such reviews should cover:
 - the effectiveness of first aid facilities and services; and
 - the distribution of relevant information.

The fourth section covers first aid personnel including senior first aid certification, occupational first aid certification, occupational health service (high risk or where staff exceed 300) and training.

The fifth section covers first aid kits. A person with a Senior First Aid qualification, or higher qualification, should be responsible for a first aid kit including:

- recommending actions regarding use, contents, modifications, and maintenance;
- ensuring a first aid kit is accessible whenever workers are at work;
- checking and replenishing contents; and
- ensuring equipment and contents are within the “use by” dates.

The advisory standard states that eyewash stations should be considered where eye injuries have been identified as potential injuries.

A first aid kit should be kept at all times on a cane railway locomotive because the standard states that:

First aid kits should be provided for workers working:

- in remote areas from which access to accident and emergency facilities may be difficult or delayed; and
- away from their employer/person in control of the workplace's establishment.

At least one first aid kit should be provided for each workplace. Appendices 4,5 and 6 cover first aid kits.

The sixth section covers first aid rooms. The *Building Code of Australia* (which applies to all new buildings built after 1/1/92) requires the provision of a casualty room with a minimum floor area of 11 m² where there are more than 200 workers. Appendix 8 covers suggested contents of a first aid room. A notice should be attached to the door of the first aid room showing clearly:

- the name of the person in charge;
- the name of the person on duty;
- locations of the nearest first aid personnel; and
- emergency after hours telephone numbers.

The seventh section covers infection control in the workplace. This section refers to appendix 2 and section 22 (risk management) of the *Act*.

33 Housekeeping

This section covers the requirements associated with maintaining a desired level of housekeeping, including housekeeping issues and standards, inspections and actions necessary to correct deficiencies.

The aim of this section is to ensure that all areas of the workplace are kept free of risks resulting from a poor standard of housekeeping.

33.1 Recommendations

Training designed to encourage awareness of the importance of housekeeping, using systems set up at each site, should be included in induction programs. Additional training may be provided as appropriate.

All employees have an obligation to maintain the required housekeeping standards in their work area and in all their activities.

Where spills may create a health and safety hazard, the area should be suitably barricaded to ensure containment of the spill and restrict access to the area.

Line managers have a responsibility to ensure that the required standard of housekeeping is maintained. Regular housekeeping inspections should be conducted and inspection kept.

Corrective action should be carried out for all deficiencies identified during these inspections.

34 Safety Signs

This section covers the issues associated with the identification of hazards by means of signs, symbolic signs, markings, colour, etc.

The aim is to ensure known hazards are identified by means of signs, markings or colour and that all personnel are familiar with the meaning of safety signs and markings.

The use of appropriate signage will be determined from the risk assessment process. Signage should only be used in conjunction with other control measures.

34.1 Recommendations

Management should be aware of the language capabilities of employees and signage in language other than english, should be considered accordingly.

Where applicable, physical hazards shall be identified by means of colour, in accordance with AS 1318.

Safety signs in accordance with AS 1319 shall be installed where required.

For sign-posting of confined spaces, refer to AS 2865.

Underground services (pipes and cables) shall be marked by means of the appropriate marking tape in accordance with AS 3000.

Pipes, conduits and ducts shall be identified in accordance with AS 1345.

34.2 References

Standards Australia.

AS 1318 – *Use of colour for the marking of physical hazards and the identification of certain equipment in industry.*

AS 1319 - *Safety signs for the occupational environment.*

AS 1345 – *Identification of the contents of pipes, conduits and ducts.*

AS 3000 – *Electrical installations – Buildings, structures and premises.*

35 Substance use/abuse

35.1 Alcohol and drugs

Statistics indicate that approximately one in five employed persons experience problems related to alcohol and almost one in ten consume alcohol at levels that are likely to affect their health. Prescription drugs may cause adverse effects at work.

Alcohol and drug use can lead to absenteeism, staff turnover and lowered productivity.

Problems that may be present at the workplace relate not just to consumption at or before work or to intoxication at work. The indirect effects of alcohol and drug problems on individuals' functioning within the workplace can also be severe.

This section sets out the legal requirements with respect to blood alcohol level within different areas of the mill including the cane railway system and discusses the potential danger of using heavy equipment whilst under the influence of alcohol. The section also makes recommendations on the contents of an alcohol and drugs policy and resource material available in this area.

35.1.1 Legal requirements

Cane railway locomotives

The Queensland *Traffic Act 1949* under section 16 (driving etc. whilst under the influence of liquor or drugs or with prescribed concentration of alcohol in the blood) requires any person who:

- drives a train; or
- attempts to put in motion a tram, train; or
- is in charge of a tram, train;

to have a zero blood alcohol reading, at all times, whilst on duty. This means that the traffic officer, locomotive driver and assistant or crew member are required to have a zero blood alcohol level. If an accident occurs at a level crossing it is very likely that the police will breathalyse all crew members of the locomotive. Some mills have purchased alcohol breathing test devices to assist crew members. These devices can not be used to prove that the blood alcohol is zero but may be used as a guide. The responsibility to ensure that the workers blood alcohol level is zero or that the worker is not affected by drugs is that of the worker.

The *Safe operating practices for cane railway* with respect to medication and drugs states:

Any crew member taking prescribed medication or drugs which could affect the performance of duties should advise their supervisor. It is important to note that some medications can cause drowsiness and affect coordination. Drivers of mobile plant and equipment should seek medical advice about the effects of the medication and drugs before operating any of these vehicles, including locomotives.

Under section 36 of the *Act* it is the responsibility of all workers to ensure that they do not wilfully place at risk the workplace health and safety of any person at the workplace. For a cane railway worker, the workplace is the railway locomotive and the railway line and any interaction with the railway line e.g. level crossing and cane railway sidings. If a worker drives a locomotive with a positive blood alcohol level, he or she is more likely to be injured or injure others.

General sugar mill workers

Sugar mill workers often deal with very large heavy equipment, work at heights, or in confined places or with specified high risk plant such as cooling towers. All sugar mill workers are under an obligation (section 36 of the *Act*) to fellow workers and other persons at the workplace to ensure they comply with management's instructions, not to wilfully place at risk the health and safety of any person at the workplace and not to wilfully

injure himself or herself. A wilful act of endangering another worker or person or themselves could include drinking alcohol to a level where the reflexes of a worker are impaired and an accident could occur.

Employer's legal responsibility

Management's responsibility is covered under section 28 of the *Act* as the general obligation of an employer to ensure the workplace health and safety of each of the workers at work.

35.1.2 Recommendation

It is recommended that a specific policy to cover alcohol and drugs in the workplace be developed and implemented.

The policy should state that all cane transport personnel are required to have a blood alcohol level of zero when at work (reference to section 16 of the *Traffic Act*.) Locomotive drivers are issued with an '*Authority to Operate*'. The policy could include a clause requiring the immediate suspension of an '*Authority to Operate*' a locomotive if any person is found with a positive blood alcohol level.

The policy should also separately cover other mill employees. It should:

- contain a clear statement of the behaviour that is expected of employees;
- apply equally to all employees, including managers and supervisors, at the workplace;
- be part of a comprehensive health and safety program;
- involve consultation with employees;
- be made known to all employees;
- address issues in the work environment that increase the use of alcohol and drugs;
- provide for appropriate treatment and rehabilitation for employees with problems; and
- be evaluated after implementation and amended, if necessary, in line with the outcome of the evaluation.

Ways of identifying alcohol and drug problems among employees include:

- self-identification and/or self-referral to a treatment program;
- identification by a co-worker;
- identification by a supervisor; and
- performance testing.

Examples of performance deficits or signs of alcohol and drugs include:

- visible evidence of erratic job behaviour, including but not limited to significant decline in the employee's productivity;
- higher than average accident rate on the job;
- repeated lateness or absence for work;
- violent behaviour;
- emotional unsteadiness;
- impaired coordination; and
- possession of an illicit substance.

35.1.3 Assistance programs

There are a number of drug and alcohol assistance programs available for workers. The use of these programs should be evaluated and adopted if considered appropriate.

35.1.4 Information about the policy

The policy should be distributed to all employees and become part of the induction course.

35.2 Smoking

Smoking is a health hazard. This fact is acknowledged on cigarette packets which warn of the health implications from smoking. Smoking also poses a fire risk. The media has recently highlighted the risks to others of passive smoking.

Within control rooms, as well as the adverse health effects from passive smoking, smoke may trigger a response from smoke detection system and initiate a discharge from the fire suppression system.

Section 28 of the *Act* states the employer's obligation for the health and safety of workers.

35.2.1 Recommendations

A site specific policy should be developed and implemented that takes into consideration the health implications on the smoker and other workers and the fire risk of smoking in a confined or enclosed space.

A risk assessment will assist to define non-smoking areas. This assessment can be conducted by all or some of the following: management, workplace health and safety officer, the workplace health and safety committee or nominated representatives.

35.3 References

Traffic Act 1949

Safe Operating Practice for Cane Railways

Division of Workplace Health and Safety. *Alcohol and Drugs and the Workplace.*

ASMC. *Example of a draft policy.*

Alcohol and Drug Use Summary

36 Health assessment

This section covers issues associated with a health assessment program. Health assessments are a useful tool to help ensure that all employees are in a state of health compatible with their job requirements, so as not to endanger their own or others' health or safety.

36.1 Recommendations

Pre-placement health assessments should be considered by management as they can provide important information relating to a prospective employee's suitability to work in a particular environment.

Health assessments should also be considered prior to a transfer to a position that involves significant change in work location, hours of work, physical demands or exposure.

Health assessment should be carried out if the line manager, supervisor or team leader has a cause for concern for the person's health and their continued suitability for a specific task or work in a specific environment.

Records of health assessments should be kept. Details of these assessments must be treated as confidential.

Appendix A - Dictionary

Building work means any work to erect, construct, extend or structurally alter a building or part of a building if the final price at practical completion is more than \$40 000.

Civil construction work includes work and/or associated work to:

- construct a railway; or
- construct a water storage or supply system; or
- construct a drainage system; or
- construct or erect an electricity generation, transmission or distribution structure; or
- construct production, storage and distribution facilities for mills, refineries or pumping stations;

if the estimated final price of the work at practical completion is more than \$40 000.

Confined space means an enclosed or partially enclosed space that-

- (a) Is not designed primarily as a workplace; and
- (b) Has a restricted means of entry and exit; and
- (c) Is, or is likely to be, entered by a person to work; and
- (d) Is, or is intended to be, at atmospheric pressure while anyone is in the space; and
- (e) Contains, or is likely to contain, any of the following-
 - (i) an atmosphere that has potentially harmful levels of a contaminant;
 - (ii) an atmosphere that does not have a safe oxygen level;
 - (iii) anything that could cause engulfment.

Construction workplace is a workplace where building work, civil construction or demolition work is done (refer s14 of the *Act*). See also *building work, civil construction work and demolition work*.

Consequence means the most probable results of an incident due to the hazard under consideration.

Demolition - means the demolition or dismantling systematically a building or other structure, or part of a building or structure, but does not include the systematic dismantling of part of a building or other structure for alteration, maintenance, remodelling or repair.

Exposure means the frequency of occurrences of the hazard.

Hazard means anything with the potential to cause injury, illness or damage.

Hot work - welding, thermal or oxygen cutting, heating, and other fire-producing or spark-producing operations that may increase the risk of fire or explosion.

Includes - where the word “include” has been used in this document the things “included” are not intended to be an exhaustive list.

Incident – any unplanned event resulting in, or having the potential for injury, illness, damage or other loss.

Interlocking guard – a guard which has a moveable part that is interconnected with the power or control system of the plant item so that, until the guard is in place, the interlock prevents the machine from operating. Interconnections can be either electrical, mechanical, hydraulic or pneumatic.

$L_{Aeq,8h}$

The term $L_{Aeq,8h}$ of 85 dB(A) means that the actual energy of all the varying noise levels experienced over 8 hours, is equivalent to 8 hours of exposure to a continuous steady A-weighted sound pressure level of 85 dB(A). The term dB(A) means that the sound level meter used a filter system to measure the sound as perceived by the human ear.

L_{Peak}

The term L_{Peak} of 140 dB(Lin) means an unweighted peak sound pressure level of 140 dB(Linear). Peak, or sudden loud noise levels above 140 dB can cause immediate hearing damage.

Management - is used as a generic term for the employer and others with a management role within the sugar mill organisation. It applies equally to a C.E.O., mill manager, factory manager, and line managers/supervisors.

May - where the word “may” is used in relation to a task to be performed by an employer or worker, it indicates that the task may be performed or not performed at discretion.

Plant - the term plant applies to a wide range of items, ranging from a complex installation, such as a water-tube boiler, to portable equipment and tools which may be moved or carried from one workplace to another.

Plant includes:

- machinery, equipment, appliances, pressure vessels, implements and tools;
- personal protective equipment;
- plant specified in Schedule 2 to the *Act*, (cooling towers, certain gas cylinders, escalators, lifts);
- a component, fitting, connection, accessory or adjunct to plant.

Plant does not include items such as scaffolding, shoring or formwork.

Probability means the likelihood that once the hazard - event occurs, the complete incident-sequence of events will follow with the timing and coincidence to result in the incident and consequences

Risk means the probability of a hazard resulting in an injury or disease or damage, together with the seriousness of the injury, disease or damage.

Risk management means the identification of hazards, the assessment of the risks associated with those hazards and the implementation of methods to eliminate or control the risks.

Roadworthy a vehicle complying with requirements under Traffic Act and able to be registered.

Roll-over protective structure (ROPS) - a frame or structure fitted to earth moving machines and tractors to reduce the likelihood of an operator, when wearing a seat belt, being crushed should the machine roll over.

Safe Work Permit - a procedure to ensure the risks associated with specific high risk tasks are documented, addressed, controlled or minimised.

Safe Work Procedure - a document to communicate to employees and contractors, the safest way of controlling identified hazards associated with a particular task.

Serious bodily injury - means an injury

- (a) that causes death; or
- (b) impairs a person to such an extent that he consequences of the injury the person becomes an overnight or longer stay patient in a hospital.

Shall – the use of the word shall means that the requirement is mandatory. This word is used when it is a requirement of the Act or Regulations.

Work Order - a formal written authority to an employee or contractor to carry out work on an item of plant, machinery equipment and/o building