ST MARK'S ANGLICAN COMMUNITY SCHOOL

DESIGN AND TECHNOLOGY

Hazard Identification and Risk Management

Guidelines

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SECTION 1 – GENERAL HAZARD IDENTIFICATION AND

RISK MANAGEMENT

IDENTIFYING HAZARDS AND MANAGING RISKS IN DESIGN AND

TECHNOLOGY

1 BACKGROUND

Design and Technology activities present one of the highest levels of risk for injury to staff and students. Therefore it is essential that the hazards associated with each activity are identified and the risk of injury assessed and minimised.

The requirement to identify, assess and control the risks in Design and Technology is based primarily on the Occupational Safety and Health Act 1984, (OSH) and Occupational Safety and Health Regulations 1996. Employers must ensure that employees and visitors are not exposed to hazards and that the risks associated with identified hazards are assessed and controlled.

This document provides information on hazards that can be found in various Design and Technology activities and provides instructions and advice on how the risk of injury can be minimised and controlled. This document also contains the working policies operating in Design and Technology at St Mark's Anglican Community School.

Acknowledgement.

This document is based on manuals from Queensland Catholic Education and the Queensland Department of Education and has been developed through a process of consultation with the Design and Technology Teachers Association (DATTA), the Australian Education Union (WA) Branch and Design and Technology teachers at St Mark's ACS.

2 DEFINITIONS

Hazard - a condition or situation that has the capacity to harm people, plant or buildings.

Risk - the likelihood of a hazard resulting in harm such as injury or disease.

Foreseeable risk - a quantified observation that could reasonably be made by a mature and prudent person in relation to a hazard and its likelihood to occur.

Controls - the measures that are put into place to eliminate or reduce a hazard and the degree of risk.

Hierarchy of control - an order of ranking which determines the priority in which an item or condition will be placed. See Section 1, Appendix 1, Step 3 – Implement Control Measures,

3 RELATED POLICIES AND PROCEDURES

Occupational Safety and Health

Duty of Care for Students

Risk Management

Student Health Care

4 RELEVANT LEGISLATION OR AUTHORITY

Occupational Safety and Health Act 1984

Occupational Safety and Health Regulations 1996

5 RESPONSIBILITIES IN MANAGING HAZARDS

The responsibility of staff to identify hazards and assess and control risk is stated in the schools, Duty of Care for Students and Occupational Safety and Health (OSH) policies.

5.1 Principal's responsibilities

The OSH policy states that the Principal has overall responsibility for the safety and health of the school. In order to meet this responsibility in regard to design and technology the Principal needs to:

• ensure that staff have sufficient knowledge, experience and information to undertake an activity safely and instruct students and they are not acting beyond their degree of competency.

• ensure that teachers have identified the hazards and controlled the risks for each activity. (Where the risk of injury to staff or students cannot be controlled the activity must not proceed).

• ensure that standard operating procedures are in place for all workshop machinery; and

• ensure that the occupational safety and health regulations including those for hazardous substances, (see section 2) equipment, fire precautions, and evacuations are considered.

5.2 Teacher responsibilities

The St Mark's ACS Risk management policy states that all employees are required to incorporate risk management into their planning and work related activities. The following provides guidance on how these obligations are met in the Design and Technology Department at St Mark's ACS.

• A hazard identification and risk management processes for Design and Technology workshops and activities incorporate the following steps:

Step 1 Teachers become aware of students Medical / Learning Alerts.

Step 2 Identify hazards, where possible as a team.

Step 3 Assess the risks associated with the hazards.

Step 4 Decide on and implement control measures.

Step 5 Monitor and review the effectiveness of the measures.

More details on the hazard identification and risk management process are provided in Appendix 1 at the end of this section.

•Teachers need to evaluate curriculum relevance and educational outcomes and balance those against any hazard and inherent danger of engaging in a Design and Technology activity.

•In order to minimise the risk of injury in all workshop activities, teachers need to determine that:

-the level of the activity is within the ability, including understanding, skill level and maturity, of the student;

-a formal induction process has been completed for each member of the class at the commencement of the appropriate learning unit;

-students have been instructed and regularly reminded that the teacher's specific permission is required before commencing any activity, and to seek assistance from the teacher when in doubt as to how to proceed safely;

-the number of students involved in the activity and the level of difficulty of the activity enables risks to be controlled and a suitable level of supervision provided;

-safety rules and procedures are established, understood and adhered to;

-students have been instructed and regularly reminded of the necessity to be responsible for their own safety and the safety of others around them;

-there is adequate lighting and ventilation for the activity to be completed safely;

-every person who participates in the activity is wearing appropriate clothing,

-footwear and personal protective equipment (PPE) and that equipment conforms to Australian Standards specifications;

-alternative activities for students who are not wearing suitable clothing or have unsuitable PPE are available;

-students have been provided with sufficient information and training in order to be able to use the PPE correctly;

-students adjacent to hazardous activities or excessive noise are wearing protective equipment;

-students operating tools and equipment know how to use them safely; and that they have understood how to apply operating and safety instructions;

-equipment has been regularly checked for electrical and general safety;

-material safety data sheet information has been obtained and reviewed for all hazardous substances including paints, adhesives, glues and solvents used in school activities;

-standard operating procedures have been developed and followed to ensure only one person operates a piece of machinery at any time;

-all risks related to using student-manufactured articles have been identified and controlled (e.g. potential manufacture defects or design faults with items such as car ramps, axle stands);

-all walkways are free of obstructions.

-as far as practicable, housekeeping within the Design and Technology area is of a standard to ensure injury will not occur.

EFFECTIVE DATE February 2014

REVIEW DATE February 2015

KEY SEARCH WORDS

OSH, OHS, D&T, safety, health, design, technology, risk management, Standard operating procedures, SOP, hazard, risk, metal, wood, plastic, welding, machinery, dust, hazardous substance, workshop, ventilation, spray painting, compressed air, thermoplastics, PPE, personal protective equipment, noise, soldering, resins.

6 HAZARD IDENTIFICATION AND RISK MANAGEMENT

Background

This section provides guidelines on issues to consider during the hazard identification and risk management process within Design and Technology at St Marks ACS.

There are a number of ways to reduce the risk of disease or injury for staff and students undertaking Design and Technology activities. Some guidelines follow for managing a healthy, safe and efficient learning environment.

6.2 Class Size

Due to the wide variation of facilities in schools, it is not possible to be prescriptive on the issue of class size (The Government School Teachers and School Administrators Certified Agreement 2000 states the range of 16-22 for practical classes - within physical and human resources). Clearly, to some extent, the physical dimensions of a workshop will determine class numbers. However, there are many other factors for consideration in setting the limits for safe numbers of students. These include factors relating to the facilities, the students, the program, classroom management and staff. They are presented in the table following.

After undertaking the Risk Management Process for a particular curriculum activity, an assessment may be made that risks associated with the class size need to be controlled. This would require consultation with the Principal (or nominated officer) to establish a suitable solution. Potential controls could include changing or modifying activities and altering the level of supervision.

EXAMPLES OF DETERMINANTS FOR SAFE CLASS SIZES

Facilities factors

• adequate ventilation;

• adequate illumination;

• non-slip, level flooring;

• safe access to equipment;

• room layout;

• the amount of space required by each student in the group to work safely in the workshop will be determined in the first instance by the space allocation determined by the Department's/ School's Building Brief;

• capacity of electrical outlets;

• the number of activities being engaged in by the student group simultaneously in the workshop and the actual size of student models.

Program factors

• inherent risk level of the activity being undertaken;

• complexity of the activity being undertaken;

• project size.

Student factors

• maturity of the individuals within the student group, and individual behavioural problems;

• maturity of the student group as a whole;

• the number of students;

• students' educational background,

e.g. non English-speaking or partially deaf;

• demonstrated responsibility;

• prior experience;

• students with special needs;

The nature of issues such as these will be specific to each school, and they are most effectively addressed by means of the Risk Management Process (see 1.5.2).

In 2005 this process was undertaken at St Mark's Anglican Community School and the following class sizes were established (unless there is a special request) ;

Year 8 workshop classes were capped to a maximum of 22

Year 9, 10, 11 & 12 workshop classes were capped to a maximum of 16

Staff factors

• availability of a competent aide, other staff member or leader;

• experience and expertise of the teacher(s) involved with the activity.

6.3 Student Safety Induction

There are a number of ways to fulfil the required student induction process.

The purposes of inducting students are:

• educate students about general work practices which will ensure their safety and

that of others;

• to educate students in existing, general school workshop safety rules to ensure a safe

working environment;

• to enable teachers to determine students' degree of experience before undertaking

practical work in the workshop for the first time;

• to clarify the students' role in maintaining a safe workshop;

• to issue a 'Student Safety Induction Worksheet/book' to students (see Appendix 2 at the end of this section); and

• to provide information on standard operating procedures.

Some points to remember are:

• do not 'overdo' the initial induction content;

• induction should not replace a comprehensive, specific, introduction to each activity;

• induction should not replace ongoing feedback to students regarding their compliance with workshop rules.

A means of permanently recording a student's participation in this induction activity is advisable. This can be in the form of a document signed off by the student and teacher to the effect that the activity has been completed, thus providing evidence of the activity.

Verbal or Written?

A student safety induction can be delivered verbally, or it can be presented to students in written form. There are a number of advantages in giving such information in written form. It guarantees that the information is consistent. It may also be an opportunity to present a questionnaire that causes the student to think through a particular problem. It will form a record, which shows a student safety induction was provided. It may include the following:

• injury reporting;

• workshop dress requirements;

• workshop safety rules;

• an introduction to the Occupational Safety and Health Act 1984; and safe operating procedures.

Information retention by students can be tested in a manner which best suits the situation, such as;

• a verbal or written safety test;

• completion of a workbook by the student to be graded by the teacher.

The operational policy for Design and Technology at St Mark's Anglican Community School is for all students to complete written Safety Induction Worksheets, before commencing practical work. Safety Induction Worksheets are included as Appendix 2 at the end of this section.

6.4 Standard Operating Procedures For Machinery And Equipment

A standard operating procedure for machinery and equipment is a sequence of logical steps that the operator follows to produce an action that has a safe outcome. In a classroom/workshop situation, standard operating procedures might be provided to students either verbally or on paper, and either to individual students or to a class of students.

Written operating procedures offer a number of advantages over verbal instructions. Some of these advantages are:

• all students receive the same standard information;

• students can be objectively tested on the content of the written instruction before they operate machinery;

• the instructions can be distributed widely to students (e.g. through the student safety workbook);

• they can be updated easily when required; and

• students can refer to the standard when necessary.

6.4.1 Developing Standard Operating Procedures

When developing standard operating procedures, consideration should be given to the functions that the operator is expected to perform (i.e. do not overload the operator with instructions.) Information most useful to the development of standard operating procedures for an item of plant is obtained from its user's manual. Written safe operation procedures are not a substitute for theoretical explanation or practical demonstrations to students. They should complement these processes in ensuring a safe environment for the equipment operator. Generic safe operation procedures for a number of common items of machinery are included in this guide in Section 3.

The minimum operational policy for Design and Technology at St Mark's Anglican Community School is for all machinery to have visible Standard Operating Procedure sheets.

Sample

STANDARD OPERATING PROCEDURE

Make and Model:(optional)

Location: (optional)

Personal Protection

Pre-Operation

Operation

Post-Operation

Additional Precautions

The format of a written standard operating procedure must be logical for the procedure to obtain its advantages over verbal procedures. Note the different sections of the procedure. They are arranged in logical order and lead the operator through the procedures to be followed before, during and after operation of the machine.

Safe operating instructions can be used to assess students' competency, or to verify that a student has understood how to apply operating and safety instructions. Issuing written standard operating procedures (such as through the student safety worksheet/book) allows students to study them in order to be assessed as being competent in using a particular item of plant (see below for more detail on assessing student competency).

6.5 Assessing Student Competency In The Use Of Machinery (optional)

Making sure students are capable of performing a task that incorporates machinery and equipment will assist in the effective management of risk. This means giving student operators of plant and equipment in a workshop sufficient instruction in its safe operation and adequate supervision. However, in some circumstances, students can't be closely supervised. The teacher may therefore need to verify that a student has understood how to apply operating and safety instructions for a specific task. This may be done through a number of means, such as:

• oral and written tests which are focussed on technological safety and literacy;

• assignments;

• operator certifications;

• practical testing and observation.

Such verification for a student would determine whether the student is 'competent' or 'not yet competent' in performing a particular task. A sample checklist for recording the results for each student is in Appendix 3 at the end of this section. Provision is made for verifying competency for the same student a number of times during the school year, such as at the start of each semester, or after a student has not used a piece of equipment for a period of time. The frequency with which the competency of students is assessed needs to be identified in the risk management process. Students who are assessed as being 'not yet competent' for a certain task must not be allowed to undertake the task.

6.6

Student Safety Contracts (optional)

A contract is an agreement between two parties. Some schools have introduced safety contracts between teacher, student and the parents/guardians. Such a contract states a number of requirements agreed between student and teacher and is to be signed by the student and that student's parent or guardian, signifying that they have each read and understood the 'contract conditions'. A contract such as this has no legal bearing and is nothing more than a mechanism by which teachers can exercise their duty of care by ensuring appropriate information is given to students. By letting parents or guardians see the document, they are being given the opportunity to acknowledge the fact that safety rules in Design and Technology exist and are considered to be very important.

An example of a student contract follows.

DESIGN AND TECHNOLOGY SAFETY CONTRACT
WORKSHOP RULES AND REGULATIONS

•Students must complete their Safety Induction Worksheet/book before being authorised to take part in practical lessons in the workshop.
•Students are to use only those tools and machinery that they have been taught to use by their teacher and, where applicable, only when they have been certified as being competent in their use.
•All tools and machinery are to be used correctly at all times.
•Workshop dress rules must be complied with at all times in the workshop. (These rules are outlined in the students' Safety Induction Worksheet/book.)
•Sensible and cautious behaviour is to be observed at all times.
•Hair is to be kept neat and tidy. Long hair is to be restrained either by a cap, ribbon, or hair net.
•Personal protective equipment is to be worn at all times when using machinery.
•All paints, acids, glues and solvents are to be used with all due caution to ensure the safety of others.
•When equipment is being used, students are to maintain a safe distance from the person using the equipment.
•Except during teacher demonstration, students are to remain outside the yellow safety lines unless they are using the machine.

I ..... (student) have read and understood the workshop safety rules and I agree to abide by them to the best of my ability. I am aware that if I continually breach these regulations I could be excluded from the workshop for the safety of myself and others.

..... (Signature)

I ..... (parent/guardian) have read and understood the workshop safety rules and agree to the enforcement of them for my child's safety. I am aware that if my child continually breaches the rules, they could be excluded from Design and Technology workshops due to the danger they pose to themselves and others

..... (Signature) ..... (date)

6.7 Emergency & Evacuation Procedures- St Mark's OH&S Policy

No building can be made entirely safe from the threat of an emergency, such as fire, and evacuation may be required. It is a legal requirement that occupants in a building must have access to evacuation information. Hence, it is important that every teacher and student who uses the Design and Technology workshops/classrooms is aware of evacuation routes and procedures.

The Policy requirement is for evacuation information to be placed close to the exit point from each classroom or workshop and regular drills are conducted .

Fire extinguishers and fire blankets must be provided to Australian Standards. This is currently 2A 40B(E) fire extinguisher in woodwork machine and general woodwork and metalwork areas. Lockdown procedures must also accompany Evacuation information. Specific action regarding Lockdown and Emergency (fire) can be obtained from the printed procedure sheets supplied by the School Executive.

6.8 Resolving Health And Safety Issues In The Workshop

The Principal and/or safety and health representative must be made aware of issues or concerns that are related to health and safety of staff or students. The Policy is for a member of the Design & Technology Department to hold a position in OH&S Committee. This process allows issues to be promptly raised and acted upon.

6.9 Accident/Injury Reporting and Investigation (extract taken from School Policy 4.3.7)

PROCEDURE FOR REPORTING AND INVESTIGATING INCIDENTS

The Principal, Bursar or Head of Staff Services must immediately advise the safety and health representative of any accident or dangerous occurrence at the workplace . It is one of the functions of the safety and health representatives to investigate incidents and arrangements need to be made to allow them to do so.

The Accident/Incident/Hazard Investigation Report Form (Appendix D) should be used to investigate reported accidents and incidents. All workplace accidents should be recorded on the above form, and the form retained at the workplace.

It is important to learn about how, when and why injuries occur by recording accident/incident information. This information can provide a factual record in the event of further enquires or litigation. It can also be used to identify hazards, determine causative factors and assist in the development of preventative strategies. Assistance in completing the form may be obtained from the Bursar.

Accident Procedure Policy by Design & Technology staff: In the event of a serious injury occurring, the following steps should be taken:

1. Workshop activities halted immediately (switch off all power)
2. Combine class with a buddy teacher, whilst injured is attended to.
3. Administration is contacted and relevant medical aid is sought.
4. Students/ teacher witnessing accident may need medical attention
5. Witness statements may need to be obtained
6. Accident/ Injury Form completed and forwarded to OH&S Committee

In the event of an illness or minor injury occurring, the following steps should be taken:

1. Staff can attend to very minor injuries (disinfect and band-aide).
2. For medication or minor accidents, Use the Sick Bay Guidelines (see extract below)

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GUIDELINES FOR THE USE OF SICK BAY

ELC, Primary and Secondary

The following guidelines detail procedures for the use of the Sick Bay. Staff must ensure that students are familiar with the procedures.

Where necessary or appropriate, First Aid, defined as the immediate treatment or care given to someone suffering from an injury or illness (Workplace WA Code of Practice) should be administered by an appropriately trained member of Staff.

The minimum standard proposed for the appropriately trained member of Staff is HLTFA201A - Provide basic emergency life support, kept current in accordance with the standard.at the point of identification. (see page 4 for more details)

The Sick Bay is to be used to observe students sent by a Staff member and where necessary:

- administer first aid
- administer medication and/or
- hold sick or injured students for collection by a parent or emergency contact

Sick or injured students should not be left alone, except when assigned to Sick Bay. Students are sent to Sick Bay for the following reasons:

- Illness occurring during class, recess or lunch times
- An accident during a lesson, in or out of the classroom
- An accident in the playground
- Requiring a change of clothing
- Administer own medication or procedure eg insulin, catheter check
- To be given prescribed medication by a Staff member, as instructed by parent

All students are to be accompanied by a student or member of Staff. Students in the Secondary School requiring medication only during class time must have their School Diary signed by the class teacher and shown to the Receptionists before administering any medication. In cases of injury, an Incident Report must be filled out by the supervising teacher and reviewed by an Occupational Safety and Health representative before handing to the Occupational Safety and Health Recording Officer.

Procedures

On entering Sick Bay:

The Receptionist assesses the student's condition, incorporating any advice from the sending Staff member, and decides that one or more of the following actions is necessary:

1. Student remains under observation for a set period.

2. Student is provided with first aid and returns to class in minor injury cases.

3. Student is provided with medication as permitted by parents.

4. Student is assessed as being unfit to remain at School and parents contacted within 30 minutes to collect student. If a parent or carer cannot be contacted or is unable to pick the child up, the child will remain in Sick Bay until the end of the School day.

5. In circumstances of extreme injury or illness, as determined by the Receptionist in their absolute discretion, an ambulance will be called and parents contacted. A Staff member must accompany the student in the ambulance. The Staff member will wait with the student at medical facility until a parent/carer arrives.

6. In any case of head injury which may involve concussion, parents will be notified, even if the student returns to class.

7. In circumstances of an anaphylactic reaction and an Epipen is administered, an ambulance will be called and parents notified.

In circumstances 5 and 7, the Head of Student Services and/or Head of School will be consulted (if circumstances permit) and/or notified. All decisions regarding any action in Reviewed November, 2012

On leaving Sick Bay
Students will be discharged from Sick Bay by the Receptionist to:
 Return to class

 Be taken home or to a Doctor by a Parent or Emergency Contact

 To an ambulance

Monitoring and Reporting
All students awaiting collection by parents or emergency contact should be monitored at no longer than fifteen minute intervals or shorter intervals if considered appropriate.
For all cases accepted into Sick Bay the following information will be recorded:
 Student name and class
 Time in and Time out
 Symptoms
 Action taken (including medication)
 Outcome
This information will be recorded in MAZE. Sick Bay information will be reviewed weekly during the Term time by the Head of Student Services. The Head of Student Services will disseminate information to relevant Heads of School or Heads of House if necessary. Reviewed November, 2012 (complete Policy in Handbook or Intranet Site)

Note: Complete Policy can be obtained on the School Web Site

APPENDIX 1

IMPLEMENTING HAZARD IDENTIFICATION AND RISK MANAGEMENT

Hazard identification and risk management is a team process. The aim is to reduce levels of risk from a high level to a level that is acceptable. Documenting the process has several advantages :risk assessment for a particular activity may be used again and again, saving time in the long term ;it is more likely that foreseeable hazards and potential accidents and incidents will be identified ;it provides a record for the teacher that all foreseeable hazards were considered and appropriate control measures, if required, were either:

- reinforced to students (such as emphasising existing school/workshop rules;) or

- established by using the hierarchy of control.

The following will assist teachers to implement the risk management process.

Step 1 - Identify The Hazards

A hazard causes harm by initiating a sequence of events that leads to injury. Hazards relating to an activity or situation need to be identified so that the potential for such a sequence of events occurring can be determined. For example acid used to clean metal is a hazard.

Hazards that need to be identified.

A general rule is to identify all hazards that could be considered capable of causing harm or damage and are reasonably foreseeable. In Design and Technology there may be risks associated with the misuse of machines by students due to a lack of knowledge, understanding, skills or due to inappropriate behaviour. The general principle that applies is that of 'reasonable care'. The duty owed to students is to take reasonable care to avoid harm being suffered.

Refer to the " Duty of Care for Students Policy" for an explanation of what constitutes 'reasonable care'.

Extract

Duty of Care refers to:

- The legal duty to take reasonable care so that others aren't harmed
- Identifying a reasonably likely risk of harm and taking reasonable care in response
- Ensuring the health, safety and welfare of all Staff, students and visitors whilst engaged in school activities

For the complete " Duty of Care for Students Policy" refer to School Web Site

Identification of Hazards.

Hazards in the Design and Technology workshop at St Mark's are identified in a number of ways. The most common methods are:

• teachers' knowledge and experience of potential mishaps and injuries;

• risk management spreadsheets;

• simple checklists;

• Material Safety Data Sheets (MSDS) and product labels;

• reviewing injury statistics;

• operation manuals for machinery; and

• observed near misses.

Step 1

Hazards are best identified and quantified by adopting a team approach that capitalises on the full range of available experience, skill and knowledge. It is very unlikely that a single person will have the breadth of knowledge to take into account all necessary factors. At the conclusion of this step, a list of hazards and potential accidents or incidents associated with a particular activity will have been developed.

Step 2 - Assess The Risks

Assessing or measuring the risk of a particular hazard enables a score to be established for each hazard. This identifies which hazards should receive the highest control priority. Some may end up being assessed as far more hazardous than first thought, whereas others may not require any additional control measures.

To determine the risk of an activity, these are the factors to consider:

1. The Likelihood – or probability of a particular consequence occurring. The likelihood is scaled in five levels ranging from very likely, where the risk would almost certainly occur; to highly unlikely, where risks would be more likely in exceptional circumstances only. When assessing the likelihood of someone being exposed to a hazard, the frequency of that exposure also should be considered.

2. The Consequences – the possible consequences of each particular hazard of an activity as identified in Step 1. The most likely, or typical, consequences resulting from exposure to a particular hazard need to be determined. Consequences range from negligible through to major where serious injury is likely to happen.

Existing Controls

Controls that currently exist are also taken into consideration when determining the level of risk. For example an existing control may be a process that has been developed to ensure people are not

exposed to the hazard (i.e. rules requiring the fixing of work) or guards placed to prevent exposure to possible moving or hot objects.

The procedure to assess risk in the St Mark's workshops is governed by the Risk Matrix.

The risk matrix is used to assess the level of identified risks and prioritise actions to reduce them. In order to use the matrix:

1. Identify the likelihood of exposure to the hazard and the consequence of someone being exposed (in the left hand column).

2. Go across the row of the likelihood identified.

3. Determine the consequence if someone is exposed to the hazard (in the top row).

4. Go down the column of the identified consequence.

5. Where the row of likelihood rating and the column of consequence rating intersect the level of risk is indicated. Below are some suggested actions for each level of risk.

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RISK MANAGEMENT MATRIX

RISK PRIORITISATIONS AND RECOMMENDED ACTIONS

		LIKELIHOOD				
		RARE 1	UNLIKELY 2	MODERATE 3	LIKELY 4	ALMOST CERTAIN 5
CONSEQUENCES	CATASTROPHIC 5	5	10	15	20	25
	MAJOR Significant 4	4	8	12	16	20
	MODERATE 3	3	6	9	12	15
	MINOR 2	2	4	6	8	10
	INSIGNIFICANT 1	1	2	3	4	5

RISK LEVEL	ACTION
1 – 3 (LOW)	Manage by routine procedure
4 – 5 (MEDIUM)	Review current procedures and, as issues arise, make necessary changes
6 - 9 (MODERATE)	Reduce as soon as possible
10 - 14 (HIGH)	Address risk as a high priority.
15 – 25 (EXTREME)	Take immediate action to rectify the problem

Likelihood

Rating	Description	Likelihood
1	Rare	May occur only in exceptional circumstances.
2	Unlikely	The event could occur at some time.
3	Moderate	The event should occur at some time.
4	Likely	The risk will probably occur in most circumstances.
5	Almost certain	The risk is expected in most circumstances.

Consequence

Rating	Description	Consequence
1	Insignificant	Can be absorbed through normal activity.
2	Minor	Management effort required to minimise impact.
3	Moderate	Isolated but significant management effort is required.
4	Significant	Isolated but can be endured with proper management.
5	Extreme	A disaster with potential to lead to the collapse of organisation.

Step 3 - Implement Control Measures

The Hierarchy of Control - A systematic approach to selecting control measures in controlling risk, there are a number of options. The options differ from each other according to how effectively they deal with the hazard. When a control measure is being chosen, start at the top level of control and

work down one step at a time until the most appropriate control measure, or combination of measures, is selected. The higher the level of control, the more effective it will be. Elimination is the most effective because the hazard (and subsequently the risk) is eliminated completely, while personal protective equipment (PPE) is the least effective because the hazard still exists in its original state. However PPE may be used in conjunction with other control measures to maximise protection.

Level 1: Eliminate the hazard

Elimination: remove the hazard or stop using the piece of equipment that could be considered a hazard, e.g. no longer using a power tool until the identified risks can be controlled.

Level 2: Minimise the risk

Substitution: replace materials or processes with less hazardous ones, e.g. replace toxic solvents with detergents; replace sprays with paint alternatives; or replace glass with plastic.
Modification: modify equipment, environment or work processes, e.g. design and install additional safety features such as guards; redesign procedures to eliminate hazardous steps; install exhaust ventilation to extract pollutants.
Isolation: isolate the student or employee from the risk, e.g. relocate hazards away from people; use acoustic booths for noisy equipment.
Engineering controls: install cut-out switches, guards and/or other controls.

Level 3: Safe work practices, personal protective equipment.
Safe work practices: adjust the time and/or conditions of exposure, e.g. regular cleaning and rubbish removal; regular maintenance; training; not allowing people to work alone. Workshop rule number 1 –students do not enter a workshop without a teacher.

Working alone & after hours & dealing with intruders policy

St Mark's Anglican Community School

WORKING ALONE & AFTER HOURS & DEALING WITH INTRUDERS
POLICY & PROCEDURE EFFECTIVE 1 JUNE 2008

1 Policy

The purpose of this policy is to, as far as practicable, reduce the risk to persons who work alone or are required to work after hours and may encounter unauthorised visitors on the site. Each of these cases pose new, specific risks which otherwise are reduced during normal working hours, e.g. reduced ability for the provision of immediate assistance. The purpose is to ensure a system is in place to adequately respond to an emergency if the need arises.

2 Scope

This document covers any person required to work alone at any period of time and where a situation arises that they may have to work after hours.

3 Responsibilities

3.1 Employees
Employees are required to adopt these guidelines to ensure safety and security for themselves.
3.2 Supervisors
Supervisors are to communicate these guidelines to employees.
3.3 Executive
Members of the School Executive are responsible for the overall implementation of this guideline in their respective work areas.

4 Definitions

After hours refers to a period of time when normal school operations cease. As this varies from day to day with after school events, anything after 10pm is classed as after hours. Exceptions to this include school holidays, where after hours is after 5pm, and weekends. *Working alone* is work carried out by a person where there are no means of visual or verbal contact with another person. *Intruder* refers to any unauthorised visitor who enters the site after hours without reference to a staff member.

5 Working alone

Under no circumstances should students work alone.

Staff generally should not work alone in:

• Laboratories where chemical substances are handled or housed or where there is a risk of injury from the work being carried out.

• In areas where power tools or hand tools that could cause injury are used.

• Areas where moving machinery is used.

• Unlocked rooms after hours

Where it is necessary, however, for staff to work alone in such areas, Supervisors should ensure that staff are fully qualified and trained in the use of chemical substances and equipment, and put appropriate mechanisms into place to ensure that staff comply with this requirement and for periodic checks of the staff members welfare. A risk assessment should be completed for working alone situations, this should take into account the hazards associated with the task, assessment of the associated risks and the appropriate controls to be implemented to ensure safety of the person. Persons required to work alone should be provided with sufficient information, instruction and training.

5.1 Considerations

When performing a risk assessment there is a variety of information worth considering:

• Length of time

o How long would the person need to be alone to finish this job?

o What is a reasonable amount of time for the person to be alone?

o Does the person have to work alone at all?

o Is it legal for the person to be alone for specific tasks e.g. confined space work?

• Communication

o Does the person have access to any forms of communication?

o Will the emergency communication system work properly in all situations?

Working alone & after hours & dealing with intruders policy May 2008 6/06/2008

• Location

o Is the work in a remote location?

o What is the risk associated with the type of transport?

o What first aid equipment is available for immediate treatment?

5.2 Emergency Assistance

Where staff work alone, a means of communication to gain assistance in an emergency must be available. Additionally, arrangements should be made for other staff to check regularly on the welfare of persons working alone.

6 Working after hours

It is important to perform a risk assessment for work required to be conducted after hours. This is to ensure that risks are identified, assessed and controlled accordingly. Working after hours may pose new, specific risks which are not applicable during normal working hours, e.g. low light conditions, personal security and working alone. As per any medium to high risk operation conducted during normal working hours, any work performed after hours should undergo a risk assessment or have an established safe work procedure. This is the best way to identify potential hazards, and minimise the risk of injury. Operations which can not be managed to a low risk are not to be performed after hours as response to an emergency may be diminished.

6.1 Record keeping

To be able to respond effectively to an emergency after hours it is essential to know who is in or is expected to be in a uilding. For this reason a member of the administration staff, usually the Bursar or delegate should be advised in advance of the work in order for them to advise security and other staff accordingly.
When working after hours, occupants should have personal identification with them at all times to be able to verify their authorisation to be on site.
6.2 Access to buildings
As school buildings and entrances are locked and alarmed after hours, staff needing to work will need to be issued with keys and security codes by the Bursar or delegate.

7 Dealing with intruders

Where an intruder is observed, if there are other staff on site, contact them to assess whether they are aware of the intruder and advise them if you intend to challenge them. Should you decide to challenge the intruder, approach with caution and politely ask the nature of their business. **Do not attempt to intervene if the individual responds aggressively or is behaving violently or in a threatening manner.**
If the intruder behaves threateningly, contact any staff member on site and advise them of the threat. If you anticipate a threat to persons or property, contact the Police on 000 immediately. Remain at a safe distance until assistance arrives and be prepared to record events.

Personal Protective Equipment (PPE)

Use equipment and clothing that is designed to standard and fits the wearer to minimise risk, e.g. respirators, goggles, gloves, and aprons.

Step 4 - Monitor & Review Control Measures

This step involves checking control measures after their implementation to see if they are effective. An important part of this step is determining whether the control measure introduced produced a new hazard that may have been previously overlooked. The same process that was used to identify hazards and assess the risks initially can be used to monitor and review control measures.

Appendix 2

Induction Worksheet for Design and Technology Students

Year 8 Materials

St Mark's Anglican Community School

Student Safety Induction Workbook

Design and Technology

Name:_____

Subject:_____

Teacher:_____

1. You must complete the worksheets in this workbook before any practical classes can be attended.

2.Once completed, this workbook is to be presented to your practical class teacher.

You must at all times comply with provisions of the Occupational Safety and Health Act 1984.

3.You must read and understand all sections contained in this workbook.

4. If you do not understand or are unclear about what is required, then you should ask the teacher.

Student Objectives

After completing this workbook, you should be able to:

1.list the minimum dress standard for entering practical classes in the Design and Technology workshop/s.

2.list the other items of personal protective equipment that are used in the workshop/s.

3.state your obligations in relation to the Occupational Safety and Health Act 1984.

4.state the school workshop safety rules.

5.state the procedures for using both:

-machinery, and

-portable power tools.

Now, read the following information and complete the worksheets

Workshop Dress and Personal Protective Equipment (PPE)

Listed below are the requirements of this school as to what you must wear when attending practical Design and Technology classes at St Mark's ACS.

1.Shirt Sleeves - either

• Short sleeves, or

• Long sleeves, which are fully rolled up.

2.Apron or coat - An apron or coat must be worn for all practical classes.

3.Footwear - Fully enclosed footwear must be worn.

4.Hair Protection - Long hair must be restrained under a cap or hair net.

5.Loose Clothing and Jewellery - All loose-fitting clothing, rings, watches, bracelets,

earrings (except for studs), necklaces, leather/cloth wrist bands, etc. must be removed or secured.

6.Eye Protection - Face shields or safety glasses must be worn when:

• you use machines and power tools;

• you are undertaking any other task where an eye injury could reasonably occur,

e.g. when chiselling or adjacent to someone else who is chiselling.

7.Hearing protection - Hearing protection must be worn when you use machines or

power tools.

8.Other PPE - You will be required to wear other PPE when you undertake specific

activities, e.g. spraying lacquer.

Note: You will be working in an environment that contains hazards. The teachers have

done their part in controlling those hazards by instituting safety measures. You are

expected to behave in a responsible manner by co-operating with your teacher.

Worksheet 1

Workshop Dress

Describe a situation in the Design and Technology workshop where an incorrect shirt

sleeve may cause an accident.

Describe a situation in the Design and Technology workshop where incorrect footwear could cause an injury.

Describe a situation in the Design and Technology workshop where unsuitable hair protection could result in an injury.

List machinery that has the potential to cause the operator an EYE injury.

Before using machinery you must read the “Standard Operating Procedure Sheet”. Where are these located?

In this space draw a student ready for working in the workshop (wearing correct PPE) and label items.

Worksheet 2

Student Safety Induction Workbook: St Mark’s Anglican Community School

In the space provided below, draw a freehand sketch of the workshop/s, clearly

indicating the following:

(a)All exits.

(b)The location and type of all fire fighting equipment.

(c)The nearest telephone.

(d)The Emergency Stop switch location/s.

(e)The location of the First Aid Kit/s.

(f)The location of the following items of personal protective equipment (PPE):

• face shields/safety glasses;

• hearing protection.

(g)Indicate and label on your sketch the storage location of any other PPE in the workshop/s.

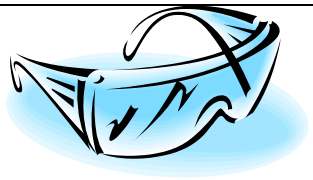
(h)Wash basins.

(i) location of the Evacuation Procedure Poster

(j)Location of four Standard Operating Procedure Sheets.

Workshop: Wood / Metal (Circle the area you are working in)

Appendix 2B



Design and Technology

Name:_____

Subject:_____

Teacher:_____

OH &S Student Activity Year 9

Step 1.
Navigate to, and read the information on the :WorkSafe website. www.safetyline.wa.gov.au.

Step 2.
Complete the following statement; "The Occupational Safety and Health Act 1984 and Occupational Safety and Health Regulations 1996" ……

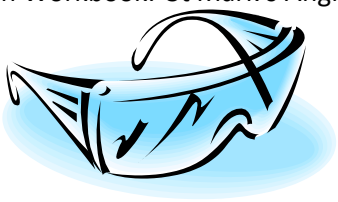
_____
_____
_____

Step 3 Describe how this information can help protect people at work.

_____
_____

Step 4 In the box draw a workshop safety poster (use colour and graphics)

Appendix 2B



Design and Technology

Name:_____

Subject:_____

Teacher:_____

OH &S Student Activity Year 10

Step 1.
Navigate to and read the information on the WorkSafe website. www.safetyline.wa.gov.au.
Step 2. Describe how this information can help protect people at work.

_____
_____

Step 3 Describe an MSDS ?

_____
_____

Step 4 What are c?

_____
_____

Copy one "STANDARD OPERATING PROCEDURE" for a machine in the Metal workshop.
Name of machine_____

MANAGEMENT FOR SPECIFIC ISSUES

HAZARDOUS SUBSTANCES

BACKGROUND

A hazardous substance is any substance that can injure or cause harm to the health of a person. This includes liquids, gases, solids, fumes, vapours and dusts. They may be everyday items such as petrol, paint, cleaning fluids, glues, or any other product that could be hazardous to health.

In a Design and Technology workshop students and teachers may be exposed to a large number of hazardous substances.

RELEVANT LEGISLATION OR AUTHORITY

The Occupational Safety and Health Act 1984 and Occupational Safety and Health Regulations 1996 place responsibilities on manufacturers, suppliers and employers to provide up-to-date, standardised information in relation to hazardous substances which may affect an end user. The legislation is relevant to all industries in Western Australia, including schools. Labelling information must comply with Health Department and Department of Minerals and Energy legislation. The OSH regulations require a supplier of a hazardous substance, for use at a workplace, to have Material Safety Data Sheet (MSDS) available to a purchaser on request. Responsibility to obtain an MSDS where one has not been provided automatically lies with the user.

WorkSafe Western Australia has also published a Guidance Note on Chemicals in Woodworking. This is available on the WorkSafe website on www.safetyline.wa.gov.au.

PRINCIPALS RESPONSIBILITIES AS REQUIRED BY OSH REGULATIONS.

OSH Regulations (1996) places responsibilities of a person who is in charge of a worksite in a school environment it is the responsibility of the Principal to ensure that:

• a register that includes an MSDS for all hazardous substances, is kept, and is available to any person who may be exposed to a hazardous substance;

• each person at the school who is likely to be exposed to a hazardous substance receives adequate information and training on safe use of the substance prior to commencing work, and records of training are kept;

• every five years or when a new substance is introduced, the risk of injury or harm occurring to a person as a result of being exposed to a hazardous substance is assessed, and where necessary, reduced;

• volumes and quantities of hazardous substances on school premises are kept to a minimum;

• labelling of all hazardous substances is correct, whether the material has been decanted or is in the original container;

•no person is exposed to a hazardous substance in excess of the relevant exposure standard; staff are aware that adverse reactions can occur to sensitive persons exposed to levels well below the set exposure limits.

Through the Principal, The Design & Technology Department at St Mark's ACS insure that OH&S Legislation is abided to.

IDENTIFYING HAZARDS AND MANAGING RISKS

These guidelines provide information on identifying and registering hazardous substances, completing an assessment of the risks associated with using the substances and identifying the means of reducing those risks. The legislation specifies what must be done, but it doesn't specify how it should be done. This decision is left up to individual workplaces. In schools, this should be determined in conjunction with relevant staff, the OSH representative and the Principal. It is recommended that staff implement hazardous substances legislation in their own subject area by prioritising and standardising their activities. This may be achieved by breaking up tasks into manageable units. For example, begin by undertaking risk assessments of those hazardous substances and activities that have the greatest harm potential.

Material Safety Data Sheets (MSDS)

Suppliers of hazardous substances must provide an MSDS to a person who purchases a hazardous substance from them or requests a copy of the MSDS. The layout of a typical MSDS is illustrated on the following page.

An MSDS for a product is an information sheet giving advice on:

• technical information, such as the product's 'flashpoint' and 'specific gravity';

• the ingredients of the product;

• its health effects and first aid instructions;

• precautions for use; and

• safe handling, storage and disposal information.

Some of the technical information may not seem useful, but other information in the MSDS

can be used to:

• undertake hazardous substances risk assessments;

• check that emergency equipment and procedures are adequate;

• check that products are being used in the intended manner; and

• decide whether any improvements should be made to control measures or procedures.

It is not possible to illustrate every material safety data sheet used in schools. They are many and varied. It is the responsibility of each individual school and department within the school to

determine the number of toxic and hazardous chemicals and to request an MSDS from the supplier for those items.

SAMPLE

MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

Page x of Total y

Date of Issue:

COMPANY DETAILS

Company:

Address:

Telephone Number:

Emergency Telephone Number:

IDENTIFICATION

Product Name:

Other Names:

Manufacturer's Product Code:

UN Number:

Dangerous Goods Class and Subsidiary Risk:

Hazchem Code:

Poisons Schedule Number:

Use:

Physical Description/Properties

Appearance:

Other Properties

Ingredients

Chemical Entity:

CAS Number:

Proportion:

Product Name

HEALTH HAZARD INFORMATION

Health Effects

Acute

Swallowed:

Eye:

Skin:

Inhaled:

Chronic

First Aid

Swallowed:

Eye:

Skin:

Inhaled:

First Aid Facilities:

Advice to Doctor:

PRECAUTIONS FOR USE

Exposure Standards:

Engineering Controls:

Personal Protection:

Flammability:

SAFE HANDLING INFORMATION

Storage and Transport:

Spills and Disposal:

Fire/Explosion Hazard:

4.2 Hazardous Substances Register

The register is a collection of all the MSDSs for hazardous substances at a workplace, along with a listing of the names of all these hazardous substances. The register contains MSDSs from all subject areas such as Design and Technology, Science and Art and will include cleaning and gardening chemicals. The school office or the sick room is a suitable place in which to keep the school's register. It is recommended that another register of hazardous substances specific to Design and Technology be kept close to where the substances are used.

4.3 Labelling Of Hazardous Substances

There are a number of legislative requirements with which labelling of hazardous substances must comply. Most products that are purchased have correct labelling. However, labelling requirements also apply when a hazardous substance is transferred or decanted from one container into a second container at a workplace. If the contents of the second container are used up immediately, a label is not required. If the contents of the second container are not used up immediately, the second container is to be fixed with a label stating:

• the substance's product name; and

• details on health hazard information, and precautions for safe use and handling.

4.4 Managing the Risks

The process for managing the risks associated with hazardous substances is the same as for any other risks in Design and Technology. This process must be completed at least every five years or whenever a new substance is introduced, or there is a significant change to the way any hazardous substance is used. See 4.6 for a hazardous substances risk assessment pro-form.

SUMMARY OF 4-STEP RISK MANAGEMENT PROCESS

Step 1: Identify Hazardous Substances in the Workshop

This might include:

Carrying out an inspection of the workshop.

Identifying hazardous substances.

Managing new products as they enter the workplace.

Recording any hazardous substances in a register.

Step 2: Assess the Risks

This involves:

•Finding out how the product is potentially harmful to persons in the workplace.

•Finding out how the hazardous substance is used, in the workshop.

•Determining whether the risk is:

- significant (which means it has to be controlled); or

- insignificant (which means existing controls are adequate.)

Step 3:Decide on and Implement Measures to Control the Risks

Controlling the risks using the hierarchy of control (see section 1 Appendix 1 Step 3). This includes the three levels of elimination of the hazard, minimising the risk of the hazard, or safe work practices and personal protective equipment.

Step 4: Monitor and Review the Effectiveness of the Measures

4.5 Managing New Products As They Enter The Workplace

New hazardous substances brought into the workplace need to be managed. This means making sure that an MSDS is supplied on the first occasion the hazardous substance is received and ensuring every hazardous substance is entered in the School Hazardous Substance Register. If no MSDS is supplied on first delivery, contact the supplier and ask for it to be faxed or mailed to the school. By law, suppliers must provide an MSDS when a hazardous substance is delivered to a workplace for the first time or on request. If it is not provided, make a note of the date of the request and seek the support of the Department's Safety Unit on 9264 4653 or 9264 4854. AISWA?

4.6 Disposal of hazardous substances

The MSDS should be checked to ensure the correct and safe disposal process of any hazardous substance is followed. It is essential that containers are correctly labelled until they are disposed of. If further information is required contact the Department' Safety Unit on 9264 4653 or 9264 4854.

Hazardous Substances

Workplace Inspection Record/Register
This pro-forma is intended for use in undertaking a hazardous substances inspection, and/or in keeping a register of material safety data sheets

Workplace Inspection Record/Register

Area/Location/s:.....

School:.....

No.

Date of Entry

Inits. Of person

Substance/Product Name

Location

MSDS

Haz Sub.

Risk

Ass.

4.6 Hazardous Substances Risk Assessment Pro-forma.
The Hazardous Substances Risk Assessment Pro-forma is intended for use in undertaking a risk assessment of a particular hazardous substance, as required by law. It includes determining whether the risk associated with the use of a particular hazardous substance is 'significant' or 'insignificant.'

HAZARDOUS SUBSTANCE RISK ASSESSMENT PRO-FORMA

A current material safety data sheet (MSDS) must be referred to.

1 Substance name:

Other names:

Location:

Uses:

U.N. no:

(Circle relevant areas)

2. Summary of health effects as listed in MSDS

• Skin: Irritant Severe

• Inhaled: Irritant Severe Toxic

• Eyes: Irritant Severe

• Swallowed: Irritant Severe Toxic

• Chronic (long term):_____

See MSDS for further information

St Mark's Design & Technology Department Hazardous Materials Policy
All hazardous materials will be entered into MSDS Registers.
Registers will be located in the following areas:

*Design & Technology Office
*Administration Office

MSDS sheets will be displayed :

*At location of use

*Storage areas

AS part of the Policy, staff are trained on correct use of all hazardous materials.

B. MACHINERY, EQUIPMENT AND GUARDING

1 BACKGROUND

The purpose of machine guarding is to prevent contact between people and the hazards of equipment and machinery such as moving parts and hot surfaces. The hierarchy of control (see Section 1, Appendix 1) is used to identify control measures for any kind of risk. Machine guarding, by its nature, is not the most effective control measure, but often it is the most practicable. (Note: elimination of a hazard is the most effective because the hazard is eliminated completely, while wearing personal protective equipment is the least effective because the hazard still exists in its original capacity.)

New items of machinery should be adequately guarded according to the relevant Australian Standards. However, some imported machinery does not comply. Also, many items are relatively old and may not ever have been adequately guarded, or have been modified by people wishing to make the machine 'easier to use.'

The risk management process can ensure that risk associated with hazards of inadequate guarding is controlled effectively.

1.1 Potential Hazards

The hazards associated with machinery and guarding include:

Parts which move or transmit power
belts & pulleys
flywheels & gear wheels
shafts & spindles
slides & cams
chain & sprocket gears
Parts that do the work
tools & dies
guillotine blades
milling cutters
circular saws
drills & chucks

To identify dangerous machine parts, look for:

'drawing in' points
shear points
impact and crushing areas
cutting areas
any protrusions which could cause injury
stabbing points
abrasion areas
flying particles
entanglement areas

2 CONTROLLING HAZARDS

2.1 Teachers need to ensure that the following machine hazards are controlled by fixed guarding that cannot be easily removed or interfered with:

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

A good rule to follow is anything that can be guarded must be guarded.

2.2 Prior to purchasing or obtaining machinery and as a condition of acceptance, machinery check for compliance with Australian Standards, and that appropriate information is provided with the item, such as operating and maintenance instructions.

2.3 It is strongly recommended that all Design and Technology staff are consulted before an item of machinery is purchased for the workshop. Everyone needs to be satisfied that the design and construction of new machinery does not pose an unacceptable risk to health and safety. A list containing the Australian Standards to be taken into account is presented in Appendix 1 Advisory Standard And Australian Standards

• Part four of the Occupational Safety and Health Regulations 1996 deal with the requirements for plant, from a manufacturer, supplier and employer perspective. WorkSafe has also produced guidelines on plant in the workplace. The regulations and the guidance note are available on the WorkSafe website on www.safetyline.wa.gov.au .

•There are also a number of Australian Standards relating to machine guarding. Some of

the most useful, available from Standards Australia are:

AS4024.1

- Safeguarding of machinery

- General principles

AS1473

- Guarding and safe use of woodworking machinery

Specifies minimum requirements for the guarding and safe use of powered machines which cut or abrade wood, wood products and like materials, to be observed by employers, trainers, employees, designers, makers and suppliers of woodworking machinery and other persons having an interest in woodworking machine operations.

AS1788.1

- Abrasive wheels

- Design, construction and safeguarding

Specifies requirements for the design and construction of abrasive wheels and the manufacture and installation of abrasive wheels and ancillary equipment. Particular requirements are given for the construction of flanges for use with abrasive wheels. Includes sections covering standard (normal) maximum operating speeds for all types of wheels.

Extensively illustrated.

AS1788.2

- Abrasive wheels

- Selection, care and use

Specifies requirements for the application and operation of abrasive wheels. Includes sections on the storage, handling and mounting of abrasive wheels, as well as conditions for using special operating speeds.

AS1893

- Code of practice for the guarding and safe use of metal and paper cutting guillotines

Outlines the general requirements, with specific requirements for the guarding of different types of machine.

Fixed, interlocked, automatic and electronic guards are included. Illustrations of suitable guards and guarding details are included.

Australian Standards are protected by copyright. However, extracts from relevant standards are available from the Department's Safety Unit (telephone 9264 4653/4854).

3 MANAGING HAZARDS

3.1 Controlling Dust – Especially That From Hardwood

Properly designed and maintained exhaust ventilation and dust collection plant at fixed woodworking machines will usually keep dust concentration within the exposure standard.

However, exhaust ventilation for narrow belt sanding machines will need careful design to ensure satisfactory dust control. Exhaust ventilation needs to be provided at fixed machines except where the machines are used only intermittently; for example where students do a small amount of machining during their lessons. In these situations, suitable dust respirators (dust masks) need to be used.

Composite boards like MDF, HDFB and particle boards also need to be considered. The greatest hazard associated with this product, and similar products, is the fine dust that becomes a slip hazard during the process of working it. Notwithstanding that, the dust is fine enough to be a respiratory hazard and it is recommended that a class P1 respirator be worn when working it.

If there is a concern that the dust/fume extraction system is inadequate to the task, contact the

Safety Unit in Central Office on 9264 4653/4854 for advice.

3.2 Dust Respirators

Dust respirators need to provide adequate protection. It is strongly recommended that they comply with the requirements laid out in Australian/New Zealand Standard 1715:1994.

These include disposable, class P1 dust respirators (shell or fold flat) or half face, dust respirators fitted with a class P1 replaceable cartridge.

Disposable dust respirators need to be discarded after one session. Cartridge respirators require regular checks to ensure that they are clean and in good working condition.

It is recommended that Class P1 masks be worn wherever exhaust ventilation is inadequate to

the task, e.g. hand sanding.

Teachers need to ensure that students receive training in the correct use of dust respirators. Correct fit is essential.

3.3 General Information On Health Issues From Wood Dust

(Extract from WorkSafe Guidance note Controlling Wood Dust Hazards at Work).

Timber is generally divided into two categories, softwoods like pine and cedar, and hardwoods like oak, teak and jarrah.

The Western Australian occupational exposure standard (OES) for airborne inhalable wood dust is 1mg/m3 (one milligram per cubic metre) for hardwoods and 5mg/m3 for softwoods. The standard for MDF is also 1mg/m3 because it can contain hardwood. The average inhalable wood dust in the breathing zone of the worker must not exceed the OES over an eight hour working shift. Where dust from timber that has been coated with a toxic substance (such as lead paint) is involved, the OES for both the toxic coating and wood dust must be complied with.

Formaldehyde readings should be below 1ppm (one part per million) when averaged over an eight hour day. Short term exposures should not exceed 2ppm.

What Work Is Hazardous?

Hazardous amounts of wood dust may be generated by jobs like floor sanding, furniture sanding, wood turning, routing, sawing, sweeping and emptying dust filters.

Dust hazards exist in varying degrees from timber felling in the forest to furniture manufacturing and cabinet making in factories and workshops. The main hazards occur where there is poor natural or mechanical ventilation.

How Can Wood Dust Harm You?

Studies in Australia and elsewhere have linked wood dust in workplaces to asthma, bronchitis, lung, sinus and throat irritations, shortness of breath and skin problems.

The IARC (International Agency for Research into Cancer), after researching nasal cancer among woodworkers in Europe, has classified wood dust a human carcinogen.

Wood dust from timbers such as beech and oak, which is fine enough to be inhaled, is known to cause cancer. Other species such as, birch, mahogany, teak and walnut may also be capable of causing nasal cancer. As this is a rare form of cancer, the risk is small and generally restricted to the finishing trades where the dust is fine.

Freshly cut trees contain large amounts of microbes, mainly moulds. The number of these increases if the logs are stored outside and under moist or humid conditions. The microbes can cause inflammation of the airways during debarking, sawing and transportation.

What About Different Woods?

While there has been considerable research carried out on European and North American species, relatively little is known about the way dusts from different Australian timbers affect people's health. Each type of timber has its own chemical components and may affect people differently.

Even less is known about dusts from imported woods, for example from Africa, South America and Asia. There is a concern that adverse health effects from some of these wood dusts may not show up for perhaps many years. Protection for workers today is therefore vitally important.

What About Chemicals?

Plywoods, fibre boards, particle boards and laminated products contain formaldehyde that can cause irritation of the respiratory system and eyes. Some suppliers provide Material Safety

Data Sheets (MSDS) or similar information on possible hazards.

Small amounts of formaldehyde may be given off during the cutting or machining of particle board, but this is seldom high enough to cause a problem. Higher levels may accumulate if products are stored in plastic or in unventilated enclosed spaces.

Many wood products have been coated with varnishes, lacquers, polishes and other chemicals. These may cause harm to health under some circumstances, and need to be considered when working with wood.

Dusts from second hand timbers may contain toxic paints, preservatives or lead. Dust from CCA (copper-chrome-arsenic) treated pine timber is not significantly more toxic than from other timbers, provided dust levels are kept below occupational exposure standards.

There are also a number of chemicals used for sealing, coating and polishing timber that may pose a hazard to workers during their application, and the hazards from these substances are described in their respective MSDS.

Further Information

The WorkSafe Western Australia guidance note Controlling Wood Dust Hazards at Work provides information on identifying hazards and controlling risks related to wood dust. It is available on www.safetyline.wa.gov.au in the section on laws. D.

ELECTRICAL POWER EQUIPMENT (PORTABLE AND FIXED)

1 BACKGROUND

Electrical power equipment refers to machines, appliances or tools that are either fixed or portable. They may be battery-operated, or run on electricity from a power source and include:

• Welders

• Sanders

• Routers

• Grinders

• Planers

• Drills/electric screwdrivers

• Thicknessers

• Soldering irons

• Lathes

• Trimmers

• Shaping machines

• Saws

• Extension leads

• Heaters

1.1

Potential Hazards

Hazards that may be encountered in operating electrical power equipment include:

• fumes and dusts;

• electricity (power faults, faulty equipment, worn cables, incorrect use);

• moving and rotating parts (blades and bits, tool disintegration);

• waste ejection (waste materials from cutting blades);

• squash and pinch (crush in equipment, e.g. pan brake);

• noise;

• heat (burns from hot materials or friction); and

• movement (artefact moving or unstable).

Information on managing hazards associated with portable electrical equipment is available from the Essentials section of the WorkSafe Western Australia website on www.safetyline.wa.gov.au.

1.2

Relevant Legislation

Requirements for the safe use of electrical equipment are covered in Division 6 of the Occupational Safety and Health Regulations 1996.

2 MANAGING HAZARDS

2.1 Controlling hazards and risks

In order to control hazards and reduce the risk of injury teachers need to ensure that they have met all their responsibilities as stated in Section 1.5.2 and also ensure that:

Design and Technology facilities are fitted with a residual current device;

guards and safety devices designed for the portable machine are in place;

electrical machines have current electrical test certification and an emergency stop fitted at the appropriate position (Australian Standard AS3760 states that electrical equipment must be tested and inspected every 12 months by a competent person);

an approved mushroom type stop button is positioned on both sides of linishall machines;

the use of extension leads is restricted where possible; electric extension leads are not laid across walkways or placed in an area where they may be subjected to abrasion or water contact;

extension leads are visually checked for cuts and defects each time they are used and are stored in a tidy manner with plug ends secured and out of the way;

extension leads are rated correctly, against the purpose to which they will be put;

fixed machines being used anywhere other than in a workshop are secured for their operation (e.g. pipe benders may be safer to use outside due to the space required for safe operation);

machinery, plant and equipment are installed to ensure that sufficient space and safe foot holds are provided around an individual machine or unit that allows for group instruction, normal operation and adjustments;

all rotating blades, pulley systems or spindles have adequate guarding during use and all guards and safety devices designed for the machine are in place;

all equipment conforms with Australian Standards (see fixed machines);

equipment and cords are regularly checked for wearing cords, loose wires etc;

students are alerted to the need to report immediately to the teacher any damage or problem associated with the equipment;

students are made aware of injuries that can be sustained from moving power tool parts;

waste materials control and disposal procedures are developed and the procedures reflect the type and volume of waste being generated;

procedures are developed for the handling of materials or tools that have cutting edges and/or that cause friction and generate heat;

students' projects and/or artefacts are securely fixed to a bench, table or floor before using any machine or power tool on them.

2.2Residual Current Devices (RCDs)

One of the best means of protection from electric shock is the use of some form of core balance earth leakage device. A residual current device (RCD) is the most common of these devices. In the event of a specific kind of fault, an RCD will switch off the current so quickly there should be minimal danger of injury. All Design and Technology facilities should be fitted with RCDs. If not inform the Principal immediately.

A conventional fuse is not to be mistaken for an RCD. Unlike an RCD, a fuse is designed to protect equipment, not people.

RCDs are relay switches that work on the principle of current balance. In any electrical tool that is in good condition, the current in the active and neutral conductors is equal and opposite. When the current becomes diverted by being earthed, such as through a person, some of the current flows to earth instead of returning through the neutral. The RCD reacts to the electrical imbalance. The result is that electricity is cut off within approximately 0.03 seconds.

RCDs are tested regularly as part of the maintenance program by qualified persons.

2.3 Location Of Power Outlets

Consideration needs to be given to the positioning of power outlets and the amount and type of equipment that will be plugged into the outlets. Outlets are often placed in positions that require extension cords to be trailed across the room or there are too few outlets for the number of appliances being used. The main hazards here are fire, electrical shock or tripping over leads.

2.4

Inspections Of Electrical Equipment

RCDs will prevent the majority of electrocutions where electrical current has been earthed through the human body. However, even with these devices, electrocution can still occur if contact by a person is made between active and neutral wires. It is highly recommended that regular visual inspections of the leads of electrical equipment are undertaken, especially commonly used equipment, to monitor the condition of the cord. It is not a requirement for a qualified electrical worker to undertake this visual inspection, however it is a requirement under Australian Standard AS3760 that electrical equipment is tested by a competent and qualified person every 12 months. The checklist below has been adapted from WorkSafe Western Australia and covers a range of areas that need to be considered.

2.5Electricity Safety Checklist

This form is intended for use in undertaking periodical visual inspections of the safety and external integrity of electrical equipment

Electricity Safety Check

Name: …… Date: ……..

There is a purchasing policy in place for electrical equipment.

Circuits are checked to make sure they are not overloaded with double adaptors and appliances.

All relevant staff and students receive information, training and supervision so that they may perform their duties in safety.

A system is in place to ensure all accidents and near misses are reported, investigated and the causes rectified.

There is a maintenance program in place for electrical installations.

Electrical equipment has been tested.

Residual current devices (RCD) are installed at switchboards or into fixed sockets.

Portable electrical equipment is protected by RCDs.

The RCD device is labelled and has been tested.

Flexible cord connections have either moulded or transparent type plugs.

Plugs, sockets and extension leads are in good condition.

Flexible cords are protected from water, being damaged or cut.

Switchboards are labelled correctly.

Switchboards are protected from damage.

Light fittings are suitable for the location. *

Light fittings are protected from breakage. *

Power points are suitable for the location and are positioned safely. *

Safety procedures are in place for employees working near overhead power lines.

If machinery is likely to expose workers to any likelihood of electrical shock.

* Particularly in hazardous areas such as spray booths and solvent storage areas

Yes

No

N/A

E.

ELECTRIC ARC WELDING, GAS HEATING, WELDING AND CUTTING

1BACKGROUND

Electric arc welding refers to the gain or transfer of molten metal from an electrode or filler rod or wire to a parent metal by the use of an electric arc. It does not include plastic welding. Gas heating, welding and cutting refers to the transfer of heat, through various means, to heat, distort, rearrange, cut, fuse or join a variety of metals or synthetic materials, and including heating liquids and cutting metals.

1.1 Potential Hazards

Hazards that may be encountered in operating electric arc welding, gas heating, welding and cutting equipment include:

• radiation and bright light: ultraviolet light can cause sunburn, skin cancer and eye damage;

• fumes: during inert gas welding, some ozone oxides of nitrogen, fluoride and silicone, as well as prolific quantities of carbon dioxide, are given off. These are highly toxic irritant gases and in both short- and long-term exposure may cause inflammation and congestion of the respiratory tract. Exposure for more than half an hour at one part per million (1 p.p.m.) or greater, results in headache and malaise;

• electrical energy (electric shock from arc welding);

• heat (hot metals and naked flames);

• welding slag (being propelled into eyes or onto skin; and

• combustible materials (may result in fire or an explosion).

Toxic fumes produced during the welding of galvanised metal, manganese steel, cadmium zinc and some other non-ferrous metals may be very dangerous and toxic and very harmful to students. Additional precautions need to be taken when welding these materials.

2 MANAGING HAZARDS

2.1Controlling hazards and risks To control the hazards associated with electric arc welding, gas heating, welding and cutting teachers need to ensure they have met all their responsibilities as stated in Section 1.5.2 and also ensure that:

welding or cutting is not carried out on or near containers that contain or have contained flammable materials, gases or liquids because of the risk of explosions;

gas welding and electric welding is carried out in separate areas to prevent the possibility of ignition of gas cylinders; if this cannot be achieved, the teacher must ensure that only one form of welding is carried out at any one given time;

the welding area is well ventilated and illuminated; adequate ventilation and extraction fan operation must be provided if welding is done in a booth;

acetylene, oxygen, liquid petroleum (LP) or other gas cylinders are stored and used in an upright position; gas cylinders must also be securely restrained to prevent them from falling over, particularly when they are used as a mobile plant;

gas volume draw does not exceed the Australian Standard Regulations; if excessive gas withdrawal is required, a manifold delivery system should be installed;

adequate screening for electric arc welding activities is provided; this protects persons not taking part in the actual welding process against flashes and radiation burns. (Screening or walls need to be non-reflective and the floor area must be clear of combustible materials including greases and oils.);

equipment that is lit is not left unattended;

equipment model and brand components are not interchanged except after consultation with the supplier and/or manufacturer, due to manufacturing irregularities;

all operators wear protective clothing that conforms with Australian Standard 1558 (Protective Clothing for Welders), including welding shields, gauntlet gloves, a leather jacket, a leather apron and spats;

students do not wear clothing that is at risk of ignition (e.g. some forms of synthetic cloth) or footwear that does not provide adequate protection;

correct cooling down and disposal of materials are undertaken;

hot materials left unattended after heating operations have the potential for combustion;

only flint, electronic spark or gas station igniters are used for lighting up;

flashback arresters are fitted to the supply and torch end of all gas welding/cutting units (see 2.3 below);

the risk of flashbacks and explosions is limited through correct closing-down procedures, correct tip selection, correct gas pressure and ensuring students do not use dirty welding or cutting tips;

students are aware of the causes of flashback and the symptoms of arc eye;

a fire extinguisher and/or fire blanket is situated in close proximity to the welding area; extinguishers need to be identified with Standard Specification Identification Code signs. Sand buckets should also be considered.

2.2 Procedures for flashback or acetylene leaks.

In the event of a flashback, close the oxygen blowpipe valve first then close the fuel gas valve. Arrange inspection of equipment by qualified personnel before relighting. In the event of an acetylene leak around the spindle, close the valve and tighten the gland. If an acetylene cylinder is heated accidentally or becomes hot through severe flashback, the following action should be taken promptly:
shut the cylinder valve;
clear all personnel from the area;
cool the cylinder with a copious supply of water; and
notify the fire brigade.

2.3 Flashback arresters
Occupational Safety and Health regulations require that four flashback arresters are used – two on each gas hose with one at each end of the hose. Flashback arresters must be the correct type and size recommended by the manufacturer. While flashback arresters are essential they are not a substitute for safe work procedures, safe transporting and storage, regular checks and maintenance.

Further information is available in the WorkSafe Guidance Note Gas Welding Safety Flashback Arresters on www.safetyline.wa.gov.au

F.SOFT SOLDERING

1BACKGROUND
Soft soldering refers to the process of joining metals through the application of lead-based materials with the aid of a fluxing agent and a heat source. The soldering process can be performed in a number of ways including:
• liquid petroleum (LP) gas heating (irons in a confined stove or combination torch and iron);
• pressure blow torch and iron (kerosene fuel);
• electric soldering irons;
• low-voltage scope soldering; and
• flame heating, such as air-LP or air-acetylene.

1.1Potential Hazards
Hazards that may be encountered in soft soldering include:
• vapours (vapour inhalation from heated fluxes and acids, and inhalation of fumes given off during soldering);
• heat (from heated materials and equipment, naked flames and fluxes);
• corrosive liquids, such as flux;
• fire (potential risk of fire from gas heating equipment);
• superheated flux (overheated soldering iron dipped in the flux dip); and

• explosion (ignited fuel gas).

WorkSafe Western Australia has developed a guidance note called Soldering in the Workplace-Rosin Fluxes. It provides guidance on the hazards arising from soldering and rosin fluxes. It is available on www.safetyline.wa.gov.au

2MANAGING HAZARDS

2.1Controlling hazards and risks
To control the hazards associated with soft soldering teachers need to ensure they have met all their responsibilities as stated in Section 1.5.2 and also ensure that:

• adequate cross-ventilation is provided during all soldering activities to prevent inhalation of fumes or vapours from acids, fluxes or gases;
• electric soldering iron stations are situated away from any damp or wet areas and where extension leads are not required;
• electrical equipment has a current electrical test certification;
• low-voltage continuous-operation soldering equipment is used;
• students are informed that they must advise the teacher if they detect a gas leak;
• suspected gas leaks are checked by using a soapy water solution applied with a brush;, any identified leaks should be reported;
• replacement (including disconnection and reconnection of cylinders) is carried out by the relevant authority responsible for replacing empty cylinders;
• gas equipment is audited each year;
• soldering tips are maintained in good working order;
• good working habits are enforced by ensuring that:
all flux containers do not leak and are equipped with suitable brushes;
'dip pots' are in good order, clean, and contain sufficient solution;
a suitable container for solder is supplied;
a fire extinguisher and/or fire blanket are in the vicinity of the soldering area;
correct containers for acids and solvents and correct storage procedures are used to minimise spillage from containers;
safety precautions are adopted to prevent possible fire hazards when using gas or petroleum liquids for heating; combustible materials must not be allowed near the work area;
correct handling methods are used when heating oils, liquids, etc. to reduce the risk of splashing;
avoid placing hot objects or tools (soldering iron) in the water of cleaning agents;
hot irons must be cooled in the appropriate fluid and place; (dip pots constitute a significant hazard in this respect);
an appropriate hot iron rest is provided for the activity;
appropriate personal protective equipment, which conforms to Australian Standards, is worn by all persons participating in the activity.

Gas Oven lighting procedures
Gas ovens must not be lit using a disposable or naked flame from a match or lighted paper. Only flint guns are to be used.
When lighting a gas oven the following procedures are to be followed:

(a)stand to one side of the oven;
(b)see that the flint gun is operative;
(c)turn on gas slowly and ignite by means of the flint gun;
(d)adjust the flame; and
(e)if difficulty is encountered in using the flint gun, turn the gas off immediately.
Be aware that in some instances excess gas build-up could occur during the use of the flint gun to light gas stoves. Taps to gas stoves must be turned off fully. A tap should never be turned off and then turned on again as the hot stove could ignite the gas build-up with explosive force. The soldering oven's gas main must be turned off (in most cases at the manifold position) when the soldering activity is completed to prevent any gas build-up, particularly overnight.

EYEWASH FACILITIES

Suitable eyewash facilities must be available in the workshop prior to the commencement of the activity. (Ideally, the facility will be connected to the mains water supply rather than stored in a plastic bottle. Water that is stored for any length of time has the potential to become contaminated and exacerbate an injury.)

G.METAL - CASTING OPERATIONS

1BACKGROUND

Metal-casting refers to activities using the group of metals whose melting points fall below 1100 degrees Celsius and which, when molten, can be transferred into a specially prepared mould (depending on the shape required), and allowed to cool. Once cool, the casting can be removed from the mould and the surface finished or machined. Forms of metal-casting not covered in this module are die-casting, drop forged and extrusion.

1.1Potential Hazards
Hazards that may be encountered in metal-casting operations include:
toxic fumes, gases, hot air that can be inhaled;
• spillage (molten metals);
• explosion (fluids in moulds);
• heat (radiated heat);
• molten metal, naked flames (burns);
• chemical (mixing chemicals, gaseous chemicals); and
• handling (relocating molten/hot materials).

2MANAGING HAZARDS

2.1It is strongly recommended that metal-casting activities are only to be undertaken in secondary schools and are to be restricted to those metals with molten temperatures below 1100 degrees Celsius.

2.2Controlling hazards and risks

To control the hazards and risks associated with metal casting activities teachers need to ensure they have met their responsibilities as stated in Section 1.5.2 and also ensure that:

• students who are not directly involved in furnace charging, slag removal, casting and other processes associated with this activity, remain clear of all furnaces, moulds and the students participating in the activity; (it is recommended that a minimum distance of 5m is maintained);
• the metal-casting area is designed using the following minimum considerations:
. the furnace and casting areas are well ventilated and lit;
. the casting area has a dry soil or sand floor to minimise the reaction of running or spilling molten metals;
. the area is clear of all grease, oils and all flammable or combustible materials; and
. flammable materials of all types are stored well away from areas designed to carry out foundry-related operations;
• ventilation fans (if installed) above the furnace and in the casting area are turned on and all doors and windows left open;
• at least one suitable fire extinguisher and fire blanket is readily available (a sand bucket is also advisable);
• activities that use solid-fuel furnaces are situated outside the confines of any building due to the excessive volumes of carbon dioxide produced;
contact of any moisture or fluids with a hot metal mould is prevented as it will explode when molten metal comes into contact with it;
manufacturer's instructions on relevant material safety data sheets are followed when mixing and storing chemicals (minimal moisture contact can cause an explosion);
all metal in a foundry is treated as hot to help prevent burns;
leather or kevlar gloves of the longer 'gauntlet' style are worn at all times, as well as a full apron and/or coat and face shield; the wearing of synthetic clothing materials is to be avoided in a foundry situation; suitable footwear must also be worn.

H.MECHANICS

1BACKGROUND

Mechanics refers to the monitoring, maintaining, fastening, locking, testing, adjusting and preparing of running internal combustion engines. It can also refer to mechanical devices and systems that allow for transfer of power or give a mechanical advantage such as pulleys and levers, gear systems and hand-powered winch systems. Activities could include tear-down, tolerance checking, repairs, replacement of components, and sequential rebuilding and testing of equipment.

1.1Potential Hazards

Hazards that may be encountered in mechanics include:
• moving parts (risk of crushing including the collapse of vehicles);
• heat (hot machinery parts);
• solvents and fuels (fire and spillage risks);
• electric shock (electrical mains, engine electrics);
• rotating machine components (rotating fan blades, pulley systems, flying objects);

• noise;
• hazardous substances, e.g. absorption (detergents, solvents, fuel, grease and oils);
• toxic fumes and dusts (carbon dioxide, asbestos particles, fuel and solvents and exhaust fumes);
• compressed air.

Further information on working with potential asbestos in automotive parts is available in the WorkSafe guidance note Asbestos Materials in the Automotive Maintenance and Repair Industry, available on www.safetyline.wa.gov.au.

2MANAGING HAZARDS

2.1Controlling hazards and risks

To control the hazards and risks associated with mechanics teachers need to ensure they have met their responsibilities as stated in Section 1.5.2 and also ensure that:

material safety data sheet information is obtained on fuels and solvents before these substances are used;

procedures are developed for the correct use and disposal of cleaning agents;

students are instructed in the dangers associated with transfer of fuel or oils in petrol- driven machines or engines;

all mechanics activities take place in an appropriate space where:
* safe handling of fuels and liquids can be achieved;
* noise and air pollution can be monitored and controlled;
* appropriate guarding on rotating parts can be achieved; and
* general engineering activities can be carried out effectively;
*dry chemical or foam type fire extinguisher and/or fire blanket is in close proximity to the fuel and oil usage area;
students wear protective clothing, including gloves and/or goggles, when using some fuels or solvents;
the equipment must conform to Australian standards;
internal combustion engines are switched off before refuelling;

where the testing of equipment that generates excessive fume levels (carbon monoxide)takes place, there is ample and safe means of exhausting those fumes from the work area;

machine guards are inspected to ensure they meet safety considerations and correct operational procedures (see Section 3 B Machinery, Equipment and Guarding);

the movement of heavy machine parts (jacking a vehicle, engine lifting) is performed in a safe manner with appropriate equipment to avoid injury;

working platforms enable engines, motors and machines to be secured during dismantling or assembly;

all asbestos particles from brake linings are contained and disposed of in a safe manner.(See reference at 1.1 for the WorkSafe Guidance Note); and

flammable liquids are kept to minimal volumes and stored in a flammable liquids cabinet when not in use.

I.OPERATING COMPRESSED-AIR EQUIPMENT

1BACKGROUND

Compressed-air equipment refers to all tools and equipment that use compressed air as a means of their functioning. A variety of compressors may be used, ranging from small portable types to large fixed machines. Pneumatic equipment includes compressors, drills, spray paint guns, sanders and pneumatic-operated equipment with cutting or grinding discs or blades.

1.1Potential Hazards

Hazards that may be encountered in operating compressed-air equipment include:

• toxic airborne particles, fumes or vapours;

• explosion (e.g. burst service pipe, cylinder or tubing);

• cutting blades, shear action, abrasive action, high-torque rotation;

• airborne material propelled by high-pressure air escaping; and

• air embolism (caused by injecting air into bloodstream through skin.

1.2

Relevant Legislation

The Occupational Safety and Health Regulations 1996 applying to plant state the legislative requirements to identify the hazards and assess the risks associated with compressed air equipment.

2MANAGING HAZARDS

2.1Controlling hazards and risks

In order to control the hazards and risks associated with the use of compressed air equipment teachers need to ensure they have met their responsibilities stated in Section 1.5.2 and also ensure that:

• compressed air is not used for cleaning down or air lines directed at any part of the body;

• pneumatic tools and equipment are only used in a workshop;

• leaking air lines are fixed as soon as detected;

• all air hoses are fitted with self-sealing fittings to prevent personal damage from an open air hose;

• compressors with cylinders that have a capacity of 26 cubic feet or more are checked by a qualified person twice a year;

• compressors are fitted with functioning relief valves and a suitable regulator;

• air pressure in compressors and pipelines does not exceed the manufacturer's specifications; air pressure must be regulated to the minimum pressure that will allow the appropriate functioning of the equipment being operated;

• where the noise level of the air-operated device and the frequency of use demand it, appropriate ear protection is worn during operation;

• adequate ventilation is available during sanding and painting;

• all compressors are marked with safe working procedures and pressure.

2.2Further Information

The WorkSafe Western Australia code of practice on spray painting and other information on

compressed air receivers is available on the WorkSafe website at www.safetyline.wa.gov.au.

J.SPRAY PAINTING

1BACKGROUND

Spray painting refers to the process of applying a protective and/or decorative coating to a variety of material surfaces of projects using a variety of liquid finishes and matched solvents and using compressed air as a propellant. Spray painting includes the use of aerosol cans;

spraying with a hand-gun and air compressor equipment; using an air brush and air compressor equipment;

and airless spray guns.

1.1Potential Hazards

Hazards that may be encountered in spray painting include:

• fumes generated from paints, pigments and thinners or solvents;

• chemicals (reaction to paint additives). The presence of these hazards may lead to injury occurring by way of:

• spillage (paints and thinners);

• fire and explosion;

• absorption (skin reaction to thinners and solvents);

• manual handling;

1.2Relevant Legislation

Subdivision 4 of the Occupational Safety and Health (OSH) Regulations 1996 covers spray painting requirements. WorkSafe Western Australia's code of practice Spray Painting provides practical advice on prevention strategies and practical means of complying with OSH legislation. It is available at www.safetyline.wa.gov.au.

2MANAGING HAZARDS

2.1Controlling hazards and risks

To control hazards associated with spray painting teachers need to ensure they have met all their responsibilities as stated in Section 1.5.2, considered the hazards in section 10 Operating Compressed Air Equipment and also ensure that:

• the storage facility for paints and thinners, etc. has ventilation to the outside of the building; the storage area or cupboard has a correct safety sign fixed in a clearly visible position and be kept locked;

• a proper spray painting booth is used which has adequate ventilation, is fitted with the appropriate exhaust system and is well lit;

• when the booth is in use the door is kept closed to maintain effectiveness of the ventilation;

• a suitable fire extinguisher is maintained in a good condition, is regularly checked and is conveniently positioned adjacent to the spray booth;

• excessive use of thinners in the preparation area is avoided to prevent a build-up of fumes;

• the entire spray painting area is regularly cleaned and free from all residue with particular attention paid to the condition of filter pads; all waste materials are disposed of in metal containers;

students are informed that they are not to dispose of pressure-pack cans; this will be done by the teacher;

naked flames are not used in the paint storage area to prevent the ignition of solvents and thinners;

any solvents, thinners or paints spilt in the painting area are cleaned up immediately and the area ventilated by opening all doors and windows;

students wear correct protective clothing at all times as some thinners, solvents and detergents can be harmful if they come into contact with the skin;

students are informed that they must not direct compressed air towards the skin due to the risk of toxic materials or air penetrating;

all relevant material safety data sheets are referred to as spray painting has the potential to be toxic and explosive;

students who are operating spray painting equipment are wearing appropriate respiratory protection equipment and have received training in the correct use of the equipment;

respiratory protection equipment is cleaned and kept in good working order.

K.WORKING WITH THERMOPLASTICS

1BACKGROUND

Thermoplastics refers to a group of plastic materials that will soften readily with the application of heat and will harden again once the temperature is reduced to normal room temperature. This process can be repeated indefinitely provided the temperature is kept below the level at which the material will burn or degrade.

Thermoplastic processes include using equipment such as a buffing machine and a strip heater and processes include:

• marking

• cutting

• filing

• drilling

• polishing

• welding (solvent and fusion).

Equipment used in higher risk activities may include:

• an oven

• vacuum forming machine

• blow forming table

• hot-air welding gun

• injection moulding.

1.1Potential Hazards

Some of the hazards that may be encountered in working thermoplastics include:

• heat (hot materials, strip heaters, ovens);

• solvents, airborne plastic particles and fumes;

• moving parts (rotating buffs, cutting blades); and

• explosion (over-pressurised plastic blow forming).

Toxic fumes given off by heated and superheated plastics, such as PVC, are a health hazard and must not be inhaled. Plastic solvents are injurious if inhaled and steps should be taken to minimise this possibility. In addition, dust from certain plastics may be harmful if inhaled and may cause irritation to the skin and eyes.

2MANAGING HAZARDS

2.1Controlling hazards and risks

To control the hazards and risks associated with working with thermoplastics teachers need to ensure they have met their responsibilities as stated in Section 1.5.2 and also ensure that:

adequate ventilation of the area is provided;

where appropriate, sanding machines are fitted with dust-extraction equipment;

the working area includes ready access to running water in case of accidental burns;

there is sufficient free space in the vicinity of the oven or heating devices to allow easy transportation of hot materials from the oven to the forming jig;

students are informed that caution must be taken when hot equipment (e.g. ovens, strip heaters and welding guns) is being used for bending plastic;

all solvents are stored in a well-ventilated cupboard away from direct access by all students;

all guards are correctly adjusted and securely fixed before beginning operations;

appropriate personal protective clothing, including protective eye wear, is worn by anyone handling heated and superheated plastics and equipment;

suitable lifting or transferring devices or gloves are available for the handling of materials in and out of ovens, etc;

combustible flammable materials are kept clear of all heating devices; a fire extinguisher or fire blanket is placed in close proximity to where the work is being carried out.

L.FIBRE-REINFORCED PLASTICS AND THERMOSETRESINS

1BACKGROUND

Fibre-reinforced plastics refers to the process of adding fibre material to thermoset resin to produce strength and stability. With polyester resins, methyl ethyl ketone peroxide (MEKP) is commonly used as a catalyst for airing the resin, the most common application being in:

• glass fibre-reinforced plastic articles;

• clear casting polyester resins; and

• polyester filler pastes, which might be used in the automobile body repair industry.

1.1Relevant Legislation

Part 5 subdivision 3 of the Occupational Safety and Health Regulations 1966 deals specifically with requirements for controlling styrene vapours and emergency egress where styrene monomer is present.

1.2Potential Hazards

Hazards that may be encountered when handling fibre-reinforced plastics and thermoset resins include:

• fumes, dust particles, gases being inhaled or absorbed through the skin;

• fire (catalyst when ignited can cause burns);

• chemicals (storage, mixing, disposing, handling);

• chemical reaction (components when mixed);

• absorption (fibre particles entering the body through the skin, handling chemicals, resins); and

• irritation (catalyst, resin or acetone in eyes or skin).

It must be noted that MEKP is a toxic material when inhaled and the peroxide component can cause serious damage to the eyes. Extreme caution is essential when handling MEKP.

2MANAGING HAZARDS

2.1Controlling hazards and risks

Teachers are responsible for managing a safe educational environment and ensuring that in all activities involving fibre-reinforced plastics and thermoset resins, safety issues and procedures are addressed. To control the hazards and risks, teachers need to ensure they have met all their responsibilities as stated in Section 1.5.2 and also ensure that:

the handling of some materials, such as MEKP, is performed by instructors only;

material contaminated with solvents is removed from the work area and stored in a place where evaporation of the solvents may take place safely;

The resulting residue material may be disposed of through the normal school rubbish channels to ensure the absorbent material does not create further hazards. Empty containers retain vapours and product residue and therefore are potentially explosive and/or may contain toxic vapour hazards.

For large spills of resin, a controlled pre-treatment of the captured contaminated resin will convert the spill to solid resin which can be disposed of through authorised school rubbish channels. The working area is well ventilated and that dust extractors are fitted to machines or areas where dust or hazardous fumes occur;

there are good washing facilities, including eye washing, near to any operation involving solvents, resins, glass fibres or catalysts;

minimal volumes of flammable liquids are at the point of use;

all chemicals are stored correctly (according to material safety data sheets) to ensure that no fire or chemical reaction can occur. MEKP has the capacity to generate sufficient heat to cause fire when in contact with organic materials;

a suitable fire extinguisher and a fire blanket are placed in close proximity to the working area;

all work benches are covered with disposable sheeting and the work area is well lit;

all students wear appropriate personal protective equipment and clothing including enclosed eye protection, respiratory equipment and gloves;

Irritation of the eyes, lungs, skin and upper respiratory tract can be caused through exposure to fibreglass mat dust, acetone and catalysts. Contact with catalysts will cause a delayed chemical burn.

all chemicals are mixed in the proportions set down by the manufacturer's specifications, metered with appropriate devices and enclosed eye protection and disposable gloves worn during mixing process;

students are aware of the signs of dermatitis and advised to use appropriate skin creams before and after using Acetone, which is a severe de-fatting agent, and can cause skin irritations or infections;

if a large spillage of acetone occurs, all students are immediately removed from the area until complete evaporation and ventilation can be effected;

students do not handle accelerators;

contaminated organic materials are disposed of correctly (see Guidelines below).

Further risk management strategies.

To minimise the risk of injury during activities involving fibre-reinforced plastics and thermoset resins, it is recommended that:

• students wear protective respiratory equipment (e.g. face masks) and enclosed eye protection whenever cured fibre-reinforced plastic is being filed, sawn or sanded in a confined area;

• full arm and leg coverage is used to protect skin from burns due to contact with uncured resin;

• care is taken when using commercial organic peroxides as they are combustible and very

corrosive substances;

• activities involving fibre-reinforced plastics are restricted to senior secondary school students;

• care is taken in the disposal of cotton waste, newspaper, wood, etc. as organic material contaminated with MEKP can be ignited from the strong oxidization reaction.

2.3Methyl Ethyl Ketone Peroxide (MEKP)

Because the concentration of MEKP varies with time, potentially leading to the formation of an unstable, explosive product, aged MEKP needs to be handled with extreme caution and be disposed of by trained personnel. Teachers need to establish emergency procedures for safe handling of MEKP including situations of:

• splashes of peroxide on to the skin - wash with soap and water;

• splashes of peroxide into the mouth - rinse out with water and drink plenty of water; and

• splashes of peroxide into the eyes - thoroughly rinse out with water immediately. Hold eye open and irrigate from inner eye outwards.

Criteria for using MEKP in schools include:

purchase only sufficient quantities for current needs;

dispose of stock on hand at the end of each school year in an approved manner;

minimise the risk of contamination by purchasing stock in small containers;

record the date of receipt on each container;

do not mix the contents of different containers of MEKP;

do not store MEKP in the flammable liquids cupboard; and

do not use syringes for the dispensing of MEKP.

N.PERSONAL PROTECTIVE EQUIPMENT

1BACKGROUND

Personal protective equipment (PPE) is equipment designed to provide a person protection from hazards. Such equipment includes gloves, eye protectors (goggles, face shields, etc.), overalls, aprons, spats, boots, and hearing and respiratory protectors. It is important to remember that Personal Protective Equipment (PPE) should be the last control measure to be chosen from the hierarchy of control (see Section 1 Appendix 1) This is because PPE does not actually remove the hazard.

2REDUCING RISKS USING PPE

2.1PPE for Design and Technology Teachers

Funding is provided to secondary school teachers in Design and Technology through the school budget. The current list of equipment is:

• lift up welding helmet

• safety glasses

• clear face shield

• dust coat

• heat resistant gloves

• dust mask (Class P1)

• welding apron

• ear muffs

• anti fog chemical goggle

2.2Storage and Maintenance of PPE

Good storage, maintenance and cleaning will ensure a longer life for expensive PPE. The condition of PPE should be checked on a regular basis. PPE also needs to be cleaned regularly to maintain adequate levels of hygiene. A good way to make sure this is done is by following a system (such as drawing up a student roster for PPE cleaning).

2.3Selection of PPE

The basic requirement in successfully selecting the type of PPE for students is to be aware of the hazards and risks in the workshop. Several types of PPE may be required to control multiple risks presented by the same tool or machine. For example using a power saw to cut wood presents risks to eyes (flying chips, dust), lungs (dust), whole of body (electrical), hands (cut), and ears (noise). An activity risk assessment will identify the types of hazards and risks present with each activity. Whatever type of PPE is selected, the items must conform to the relevant Australian Standard. Students need to be shown how to use each item of PPE properly. This includes an explanation regarding why it is to be used, and its proper use, as well as information on how to get a "good fit" so as to make it as comfortable as possible.

O.NOISE EXPOSURE

It has long been recognised that Design and Technology teachers are often (not always) exposed to noise above the action level of LAeq 8hr, 85 dB(A). That is to say that they may receive noise, extrapolated to eight hours, above 85 decibels A – weighted. Noise at that level, over a period of time, will have an adverse effect on the hearing of most people.

1Testing

Any employee who has been assessed as receiving noise above the Action Level is entitled, and encouraged, to have a 'Baseline Hearing Test'. The process for arranging a test is detailed in the Hearing Tests procedures on the Regulatory Framework. Results of the test are confidential and cannot be revealed to the employer except at the express consent of the employee. There is no cost to the employee or the school.

. An Only one test is required during a staff member's employment with the Department exit test

is also recommended when leaving employment.

2Protection

All but the newest high schools will have had a ‘noise survey’ carried out and a result of the survey is a ‘noise report’ which will have been supplied to the school. That report will provide recommendations on suitable hearing protectors.

Further specific advice on hearing protectors may be obtained from the Department’s Safety Officers. In general, suitable hearing protectors will carry the Australian Standards Triangle, be purchased from a reputable supplier of safety equipment, and provide the minimum (not maximum) degree of protection necessary to reduce received noise to below 85dB(A).

Hearing protection must be provided free of charge by the employer and once provided, becomes the employee’s responsibility to care for it.

3Noise Management

Exposure to excessive noise should be minimised by scheduling quiet/noisy periods so that hearing has a chance to recover.

Further advice on this subject is available from the Safety Unit on 9264 4653/4854 or in the WorkSafe Western Australia Code of Practice Managing Noise at Workplaces available on www.safetyline.wa.gov.au under laws.

P.

DEVELOPING STANDARD OPERATING PROCEDURES

(A MODEL)

When developing standard operating procedures, consideration should be given to the functions that the operator is expected to perform (i.e. do not ‘overload’ the operator with instructions). Information most useful to the development of standard operating procedures for an item of plant is obtained from its user’s manual. Written safe operation procedures are not a substitute for theoretical explanation or practical demonstrations to students. They should complement these processes in ensuring a safe environment for the equipment operator.

In this section there are safe operation procedures for a number of common items of machinery. However, before they are used, it is essential that their suitability for the school’s existing machinery and equipment is determined.

Further information on the use of standard operating procedures is in Section 1.6.5.

SECTION 3 – STANDARD OPERATING PROCEDURES

Bench Drill

Table Circular Saw

Electric Spot Welding

Machine

Metal Lathe

Milling Machine

Pim 20 Injection Moulding Plastics Strip Heater

Machine

Polishing Buff

Portable Power Drill

Portable Router

Router Lathe/Overhead

Router

Vacuum Forming Machine

Table Router

Band Saw

Blow-Forming Table

Dowelling Machine

Bench Grinder

Compressed Air

Linisher Disc And Belt

Sander

Mitre Drop Saw

Plastics Welding Gun

Portable Power Saw

Spindle/Bobbin Sander

Wood Lathe

It is recommended that similar safe operating procedures be developed for additional equipment that is in the school's workshops/departments.

SAFETY OPERATING PROCEDURES

Bandsaw

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

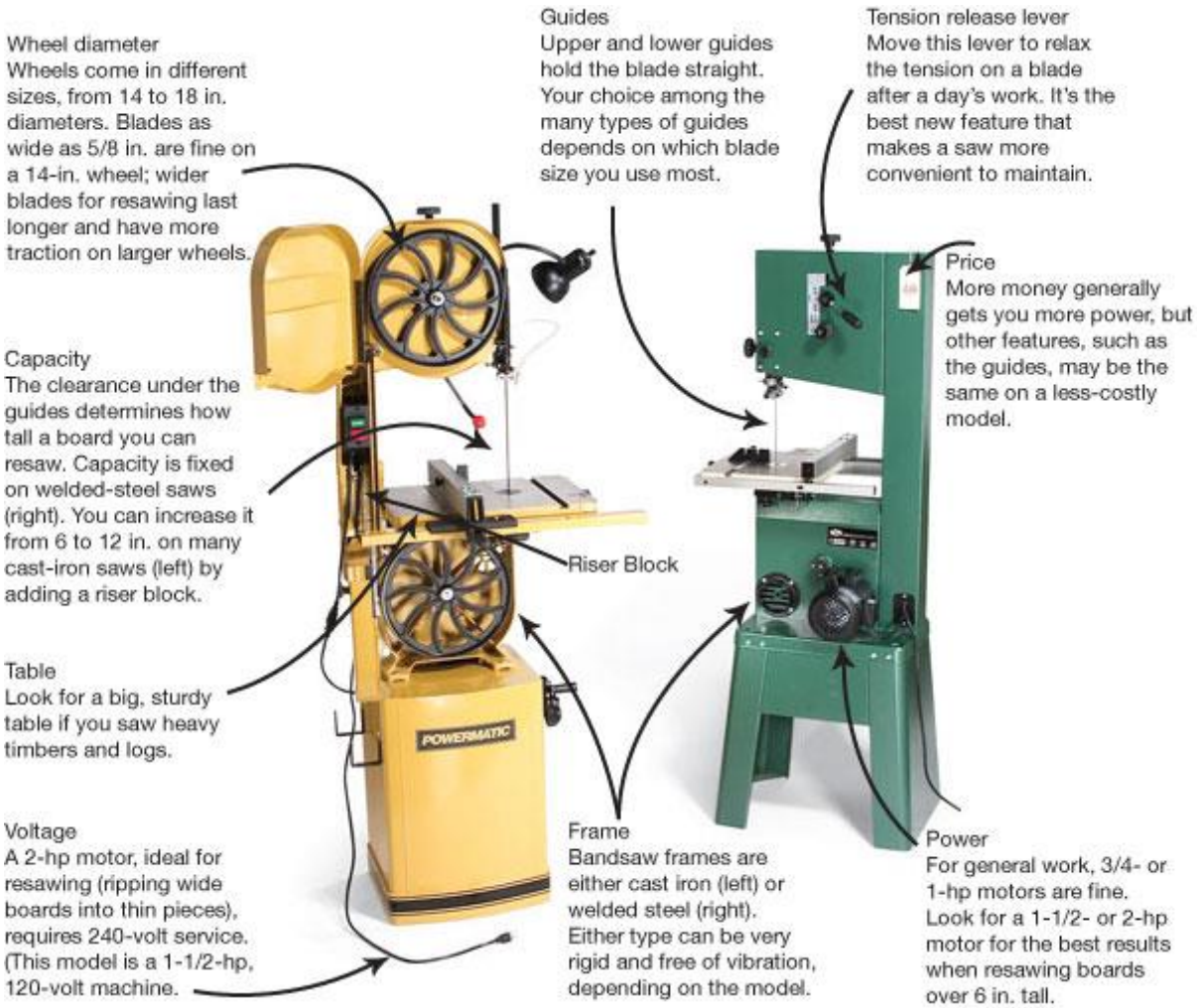
Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Hearing protection may be required for some operations.



SAFETY OPERATING PROCEDURES

Bandsaw

PRE-OPERATIONAL SAFETY CHECKS

1. Ensure no slip/trip hazards are present in workspaces and walkways.
2. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
3. Check that all guards are in position.
4. Ensure push stick is available.
5. Lower the blade guide and guard to full effect.
6. Start the dust extraction unit before using the saw.
7. Faulty equipment must not be used. Immediately report suspect machinery.

OPERATIONAL SAFETY CHECKS

Keep fingers off the line of the cut at all times

1. Never leave the machine running unattended.
2. The workpiece should be fed forward evenly and held firmly on the table to ensure effective control during cutting whilst keeping hands in a safe position.
3. Use a push stick when feeding material past the blade.
4. Do not force a wide blade on a cut of small radius. Use relief cuts when cutting sharp curves.
5. Before making adjustments switch off the saw and bring the machine to a complete standstill.
6. Stop the machine before attempting to back the work away from the blade.
7. Stop the saw immediately if the blade develops a ‘click’. Report it to your teacher.

HOUSEKEEPING

1. Switch off the saw and reset all guards to a fully closed position.
2. Leave the machine in a safe, clean and tidy state.

FORBIDDEN

- Attempting to cut very small items
- Cutting cylindrical or irregular stock

SAFETY OPERATING PROCEDURES

Drill Press

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

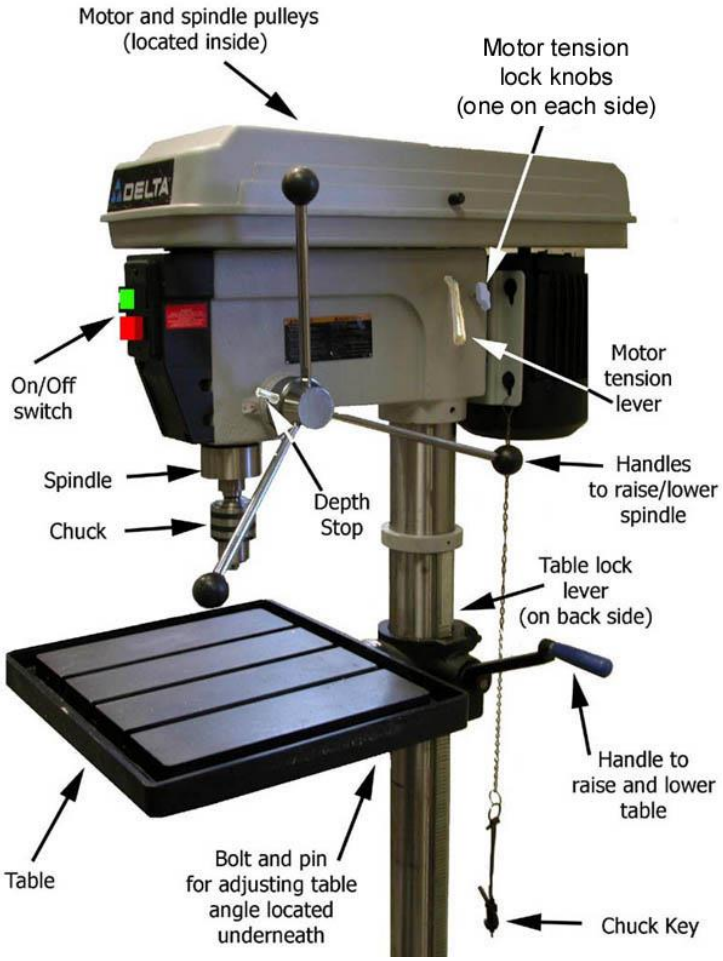
Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Gloves must not be worn when using this machine.



SAFETY OPERATING PROCEDURES

Drill Press

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspace and walkways to ensure no slip-hazards are present.
2. Check that the drill chuck guard is in position.
3. Ensure the chuck key (if used) has been removed from the drill chuck.
4. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
5. Follow correct clamping procedures to ensure work is secure.
6. If the job obstructs the walkway erect a barricade.
7. Adjust spindle speed to suit drill or cutter diameter.
8. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

1. Never leave the Drill Press while it is running.
2. Before making adjustments or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.
3. Feed downwards at a sufficient rate to keep the drill cutting.
4. Feed with care as the drill breaks through the underside of the work.
5. Use a safe working posture (beware of hair catching).

HOUSEKEEPING

1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Hair/clothing entanglement - rotating spindle/drill
- Eye injuries
- Flying swarf/chips
- Sharp edges & burrs

SAFETY OPERATING PROCEDURES

Pedestal Grinder

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

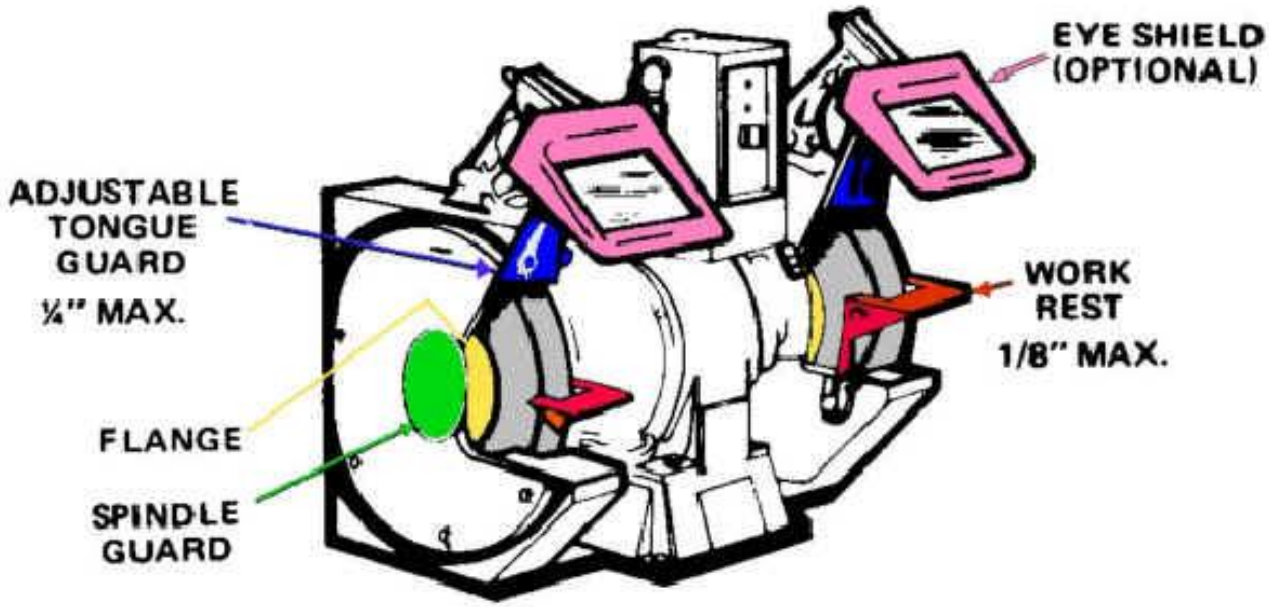
Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Hearing protection must be used when using this machine.



SAFETY OPERATING PROCEDURES

Pedestal Grinder

Only one person may operate this machine at any one time.

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspaces and walkways to ensure no slip/trip hazards are present.
2. Ensure all guards and safety shields are in position before starting the grinder.
3. Ensure that the wheels do not touch the work rest and that the gap between wheel and rest is no greater than 1.5mm.
4. Check that wheels are running true and are not glazed or loaded.
5. Locate and ensure you are familiar with the operation of the ON/OFF starter.
6. Faulty equipment must not be used. Immediately report any suspect machinery.

OPERATIONAL SAFETY CHECKS

1. Stand to the side of the wheels when starting up.
2. Let the wheels gain maximum speed before starting to grind.
3. Do not grind on the side of the wheel.
4. Small objects must not be held by hand.
5. Never leave the machine running unattended.
6. Do not bend down near the machine whilst it is running.
7. Never force the workpiece against a wheel.
8. Slowly move the workpiece across the face of the wheel in a uniform manner.
9. Coolant spilt on the floor should be immediately absorbed.

HOUSEKEEPING

1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Hot Metal
- Sparks
- Noise
- Sharp edges and burrs
- Entanglement
- Wheels ‘run on’ after switching off
- Eye injuries

FORBIDDEN

- Workpiece must never be held with gloves, cloth, apron or pliers
- Grinding non-ferrous metals

STANDARD OPERATING PROCEDURE

Type of machine/equipment: BLOW-FORMING TABLE

Check the general condition of the blowing table. Ensure that air connections are secure and that clamping arrangements are adequate, secure and correctly adjusted. Report any defects to the teacher.

Use only a low-pressure air supply. (15-20psi or 105-140 kPa should be adequate.)

Before applying pressure to the plasticsmaterials, clamp the forming ring, and, if they are to be used, the restraining bars and plates, securely to the table.

Have the teacher check all adjustments and preparations before attempting to blow form an article.

Take particular care when blow-moulding since greater pressures are used in this process than are used in the free blowing process. Care must be taken to provide adequate clamping pressure. The moulds must be constructed strongly enough to withstand these pressures.

Turn off the air supply before releasing the clamps.

On completion of the work, ensure that the forming table and the work area are left in a safe condition. Return all parts to their proper storage place.

Handle heated material with suitable gloves.

Never apply excessive air pressure to the article as it may rupture. Never attempt to blow form material that has not been heated to forming temperature.

Do not use compressed air to cool down an article or to clean down the work area. Flying particles are a serious hazard.

STANDARD OPERATING PROCEDURE

TABLE CIRCULAR SAW

Consider a class P1, dust mask where fine dust is being generated.

Select the correct type of blade. Check the sharpness, set and general condition.

Adjust guards to the minimum practicable clearance from the timber to be cut.

Ensure that the riving knife is correctly adjusted and securely mounted.

Ensure that all guards and safety devices are in position and secured.

Lock the table securely after adjustments are made.

Check material to be sawn for defects, loose knots and foreign matter such as nails and embedded grit.

Stand to one side of the line of the saw when turning on the power.

Use a suitable push stick for short or narrow timber and in removing off-cuts from the table.

Feed material only as fast as the saw will cut freely.

On completion of the job, turn off the isolating switch and ensure that the work area is left in a safe condition.

Ensure work area is left in a safe condition.

Handle saw blades with extreme care to protect the teeth of the saw and to prevent personal injury.

Make adjustments only when the machine is at a dead stop.

Always use a ripping fence or a cross-cutting slide.

Freehand sawing is extremely dangerous.

Except when using a backup block, never lower pieces of stock down over the saw.

Never remove saw dust from the saw bench byhand. Stop the machine and use a brush.

FIXED + STATIC PLANT

SAFE OPERATING PROCEDURES

AIR COMPRESSOR

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission

Safety glasses must be worn at all times in work areas.

Appropriate protective footwear with substantial uppers must be

Rings and jewellery must not be worn.

Long and loose hair must be contained or restrained.

Close fitting, protective clothing or a workshop apron is

Ensure all flammable materials are safely stored away from the compressor unit.

PRE-OPERATIONAL SAFETY CHECKS

1. **Ensure no slip/trip hazards are present in workspaces and walkways.**
2. **Locate the compressor in a suitable location for safe operation.**
3. **Lock the wheels on the base of the compressor to prevent movement.**
4. **Check that all fittings and connections are in good condition prior to starting.**
5. **Check all fittings are securely connected prior to being pressurised.**
6. **Faulty equipment must not be used. Immediately report suspect machinery.**
7. **Locate and ensure you are familiar with the operation of the ON/OFF starter switch.**

OPERATIONAL SAFETY CHECKS

1. **Start the compressor noting pressure increase and cut-out/cut-in pressure.**
2. **Listen for any air leaks from any flexible airlines and immediately report if any leaks are observed.**
3. **Adjust pressure regulator to suit work requirements.**
4. **Check the compressor at regular intervals.**
5. **Never use compressed air for personal cooling or blow dust from any part of the body or from clothing**

HOUSEKEEPING

1. **Switch off the compressor at the close of each day (or after use)**
2. **Leave the machine, hose and work area in a safe, clean and tidy state.**

POTENTIAL HAZARDS

- **Unsecured hoses whipping under pressure**
- **Compressed air**

STANDARD OPERATING PROCEDURE

DOWELLING MACHINE

Safety

Select the correct size drill to suit work.

Make all adjustments with the isolating switchoff.

Replace guard over drill when fitted.

Set table height.

Set depth gauge.

Set fence for position of material.

Keep both hands on material while drilling.

When finished, turn isolating switch off and remove drill.

Leave machine in a safe and clean condition.

Always stop the drill and keep hands away from drill when cleaning table top.

SAFETY OPERATING PROCEDURES

Spot Welder

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.


Safety glasses must be worn at all times in work areas.


Long and loose hair must be contained.


Sturdy footwear must be worn at all times in work areas.


Close fitting/protective clothing must be worn.


Rings and jewellery must not be worn.

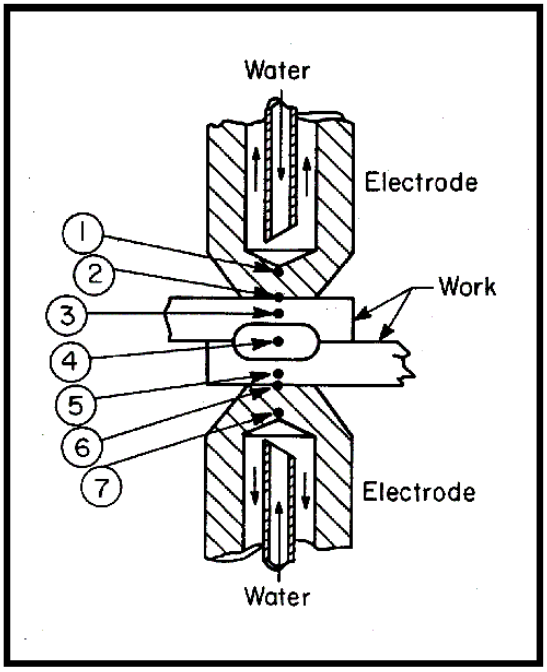

Leather gloves must be worn when handling hot metal.

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspaces and walkways to ensure that no slip/trip hazards are present.
2. Check switchgear and cable are in sound condition.
3. Check electrode points are in good condition and meet exactly.
4. Ensure electrodes are securely mounted and clean from contaminants.
5. Set pressure on clamps to hold work securely without damaging work.
6. Preset weld time under teacher direction (if timer fitted).
7. Gloves should be used to position and hold work.
8. Faulty equipment must not be used. Immediately report suspect machinery.

SAFETY OPERATING PROCEDURES

Spot Welder



OPERATIONAL SAFETY CHECKS

1. Ensure the spot welder has cooled before making any adjustments.
2. Avoid prolonged use due to heat build-up of electrodes and arms.
3. Take care when holding work due to heat created during welding process.

HOUSEKEEPING

1. Switch off the spot welder.
2. Leave the work area in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Electrodes become hot with continued use
- Burns
- Hot metal
- Spitting metal or flying sparks
- Eye injuries

Department of Education, Training and Emp

FIXED + STATIC PLANT

SAFE OPERATING PROCEDURES

BELT – DISC SANDER

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission

Safety glasses must be worn at all times in work areas.

Long and loose hair must be contained or restrained.

Appropriate protective footwear with substantial uppers must

Close fitting, protective clothing or a workshop apron

Rings and jewellery must not be worn.

DO NOT wear gloves when operating this sanding

Only one person may operate this machine at any one time.

PRE-OPERATIONAL SAFETY CHECKS

1. **Check the workroom and walkways to ensure there are no slip/trip hazards present.**
2. **Ensure you are familiar with the operation of the ON/OFF DOL switch and Emergency Stop.**
3. **Check the sanding disc table is set not more than 2mm from disc.**
4. **Check the linishing belts and discs are both in a serviceable condition.**
5. **Ensure the operator be positioned out of direct line of abrasive belt at all times.**
6. **Ensure dust extraction is on before operating either sanding machine.**
7. **Faulty equipment must not be used. Immediately report suspect machinery.**

OPERATIONAL SAFETY CHECKS

1. **Both components of this combination machine should NOT, where possible, be operated simultaneously.**
2. **Allow machine to reach maximum revolutions before operating to avoid overloading.**

3. **Always place material on the table on the downward side of the disc travel to hold it secure on the table surface or belt surface. Never attempt to sand very small items by hand.**
4. **Hold material firmly against stops or table before applying pressure on abrasive disc or belt.**
5. **Keep fingers clear of sanding disc or belt while sanding.**
6. **NEVER attempt to sand very small items or try to sharpen metal items.**
7. **Never leave the machine while it is running.**
8. **Before making adjustments switch off and bring the machine to a complete standstill.**

HOUSEKEEPING

1. **Switch off the machine and leave the floor area in a safe, clean and tidy state.**

2. **Make sure good housekeeping practices are in place to minimise dust/waste build-up.**

POTENTIAL HAZARDS

- **Exposure to moving, abrasive & rotating parts**
- **Pinch & squash**
- **Ejected waste**
- **Excessive wood dust**
- **Eye injuries**
- **Burns to skin**

SAFETY OPERATING PROCEDURES

Metal Lathe

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Gloves must not be worn when using this machine.

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspaces and walkways to ensure no slip/trip hazards are present.
2. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
3. Ensure all guards are in place.
4. Check that the job is clamped tight in the chuck.
5. Remove all tools from the bed and slides of the machine.
6. Ensure correct speed for machining process is selected.
7. Remove the chuck key before starting the lathe.
8. Do not try to lift chucks or face plates that are too heavy for you.
9. Faulty equipment must not be used. Immediately report suspect machinery.

OPERATIONAL SAFETY CHECKS

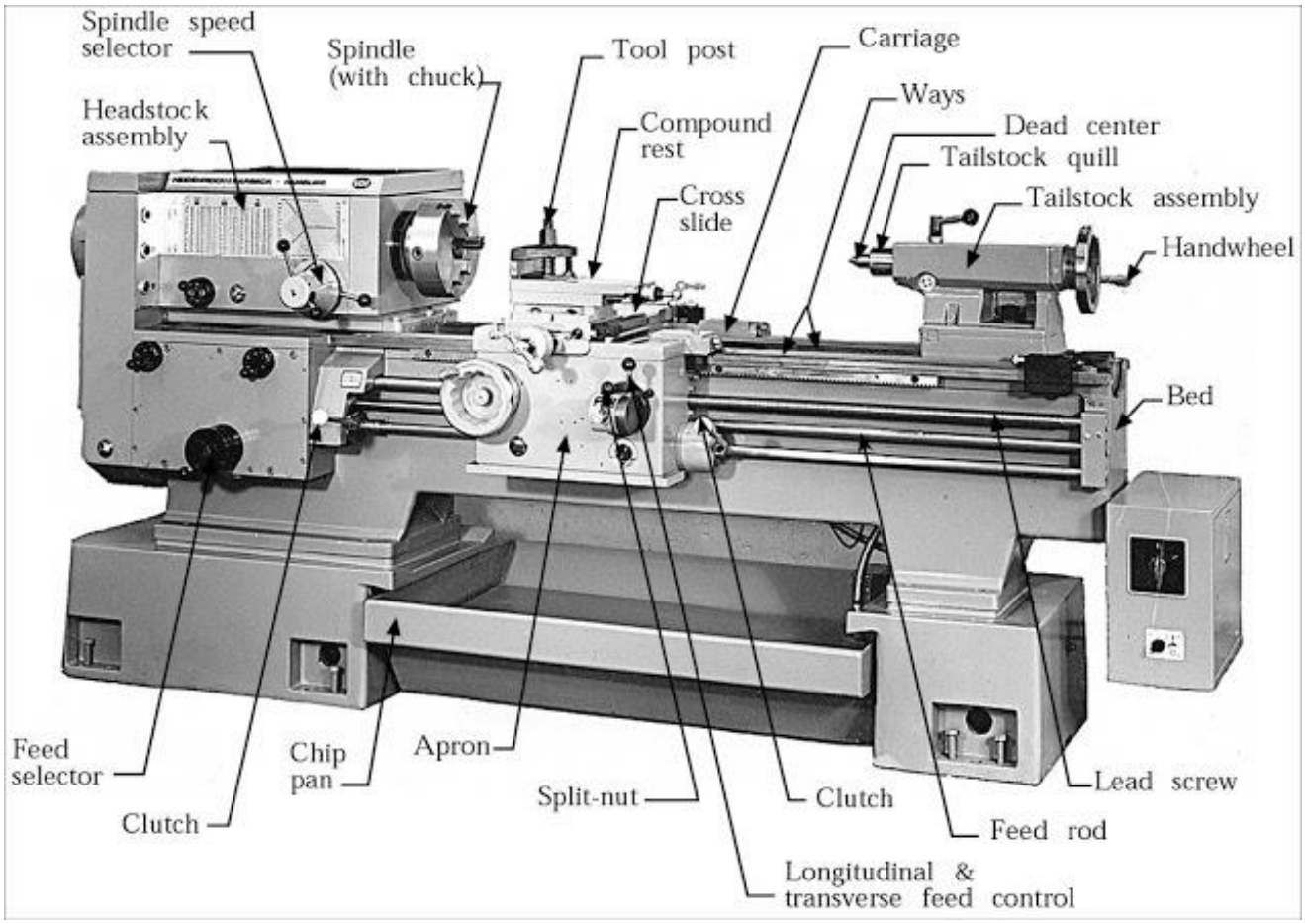
1. Never leave the lathe running unattended.
2. Before making adjustments or measurements switch off and bring the machine to a complete standstill.
3. Do not attempt to slow/stop the chuck or revolving work by hand.
4. Avoid letting swarf build up on the tool or job. Stop the machine and remove it.
5. Always remove the chuck key from the chuck.
6. Do not store tools and parts on top of the machine.

HOUSEKEEPING

1. Switch off the machine and reset all guards to a fully closed position.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Flying objects - chuck key left in chuck
- Cutting tool injury when cleaning, filing or polishing
- Rotating machine parts - entanglement
- Metal splinters/swarf
- Eye injuries



SAFETY OPERATING PROCEDURES

Milling Machine

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Gloves must not be worn when using this machine.

PRE-OPERATIONAL SAFETY CHECKS

1. Ensure no slip/trip hazards are present in workspaces and walkways.
2. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
3. Do not leave equipment on top of the machine.
4. Check that machine guards are in position.
5. Ensure cutter is in good condition and securely mounted.
6. Check coolant delivery system to allow for sufficient flow of coolant.
7. Faulty equipment must not be used. Immediately report suspect machinery.

OPERATIONAL SAFETY CHECKS

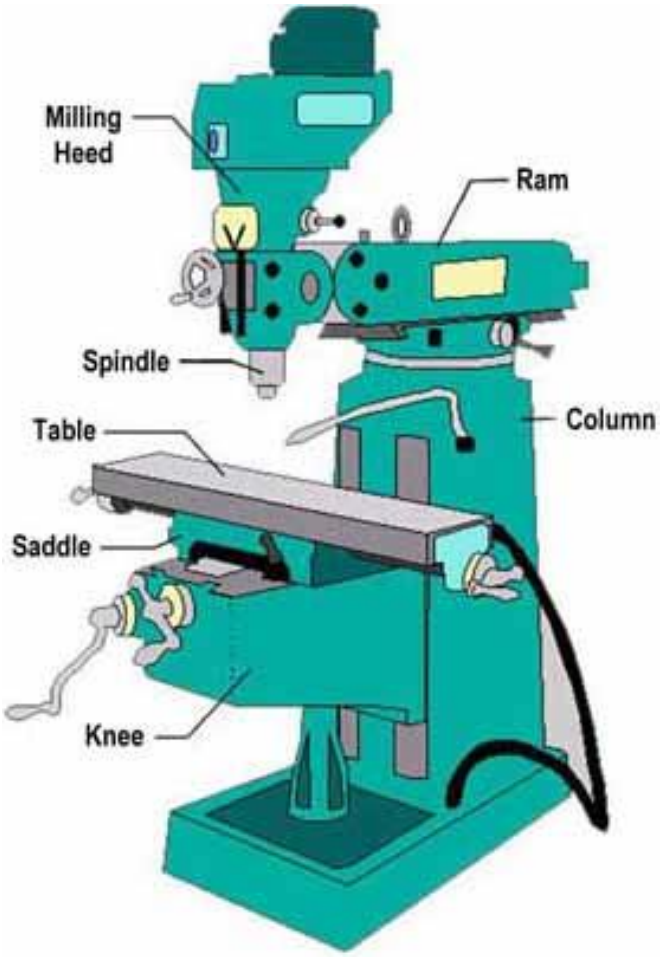
1. Keep clear of moving machine parts.
2. Never leave the machine running unattended.
3. Follow correct clamping procedures- keep overhangs as small as possible and check work piece is secure.
4. Set the correct speed to suit the cutter diameter, the depth of cut and the material.
5. Before making adjustments and measurements or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.

HOUSEKEEPING

1. Switch off the machine.
2. Remove milling cutters and store them safely.
3. Leave the machine and work area in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Sharp cutters
- Moving components - hair/clothing entanglement
- Eye injury
- Skin irritation
- Metal splinters and burrs
- Flying debris



Milling Machine

SAFETY OPERATING PROCEDURES

Compound Mitre Saw

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

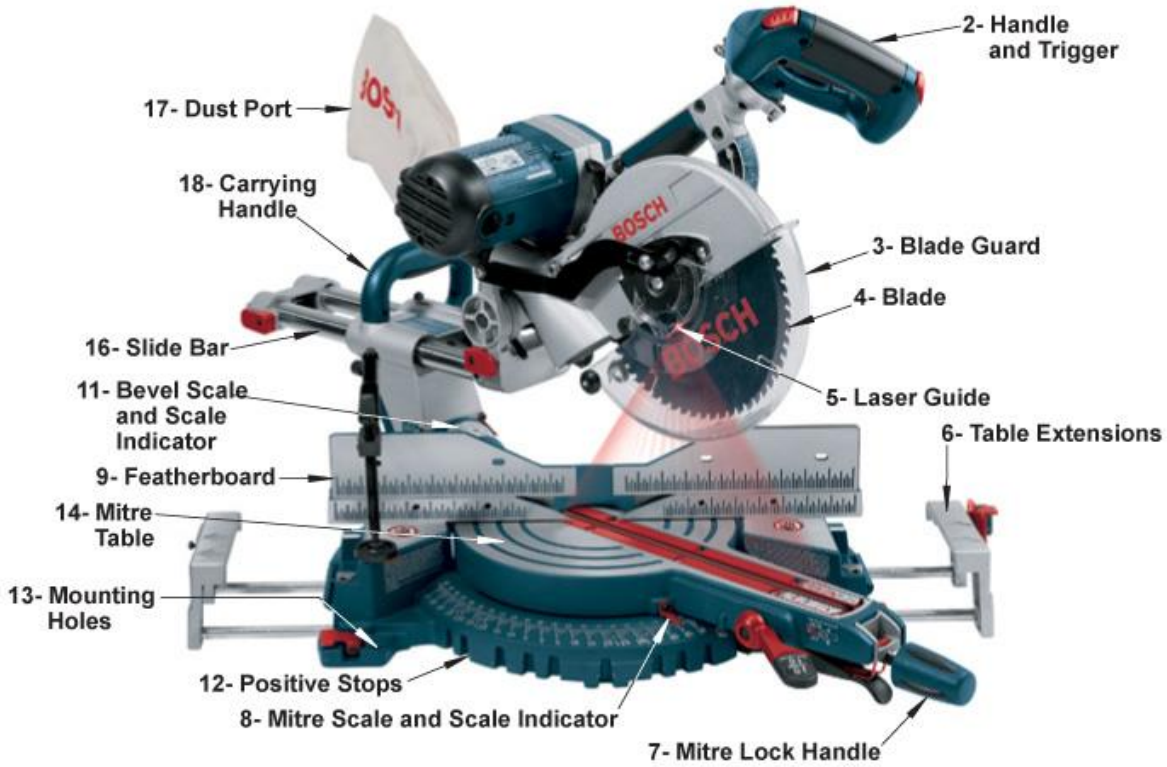
Sturdy footwear must be worn at all times in work areas.

Rings and jewellery must not be worn.

Long and loose hair must be contained.

Close fitting/protective clothing must be worn.

Hearing protection must be worn when using this machine.



SAFETY OPERATING PROCEDURES

Compound Mitre Saw

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

PRE-OPERATIONAL SAFETY CHECKS

1. Ensure the saw is properly secured to a worktable by bolts/ clamps at approximately hip height.
2. Ensure the saw is operated on an RCD protected circuit.
3. Check workspaces and walkways to ensure no slip/trip-hazards are present.
4. Check that all safety guards are in position and are operational.
5. Ensure you are familiar with the operation of the ON/OFF starter.
6. Keep table and work area clear of all tools, off-cut timber and sawdust.
7. Start the dust extraction unit before using the machine.
8. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

Do not use this saw to cut pieces that are too small to be securely clamped.

1. The maximum cut for the machine must not be exceeded.
2. Ensure all adjustments are secure before making a cut.
3. Use clamps to secure and support the workpiece to a stable platform. Do not use a length stop on the free scrap end of a clamped workpiece.
4. Do not cut more than one workpiece at a time.
5. Before turning on the saw, perform a dry run of the cutting operation to ensure that no problems will occur when the cut is made.
6. Do not start the saw with the blade touching the workpiece. Allow the blade to reach full speed before contacting the workpiece.
7. Avoid reaching over the saw line. Do not cross arms when cutting.
8. When students are cutting both their hands must be on the saw handle.
9. If workpiece is bowed or warped, clamp it with the outside bowed face toward the fence.
10. After finishing the cut, release the switch, hold the saw arm down and wait for blade to stop before removing work or off-cut piece.
11. Disconnect the plug from the power source and bring the machine to a complete standstill before making any adjustments.

HOUSEKEEPING

1. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Saw may grab and 'kick-back' toward operator
- Flying chips and airborne dust
- Contact with rotating blade

FORBIDDEN

- Cutting branches, wood with embedded nails or screws
- Cutting dowel
- Ripping solid timber along the grain
- Cutting ferrous or non-ferrous material

STANDARD OPERATING PROCEDURE

INJECTION MOULDING MACHINE

Safety

Fill the hopper to the correct level with granules.

Turn power on at wall and also on at machine

Adjust temperature knob on control panel to HIGH.

Wait approximately 20 minutes for machine to reach operating temperature. (Heating light

will turn off.)

Release capstan handle and wind table down until mould is positioned securely, ensuring

injection nozzle is firmly against the receiver of the die, then clamp the table.

Turn red mushroom knob until the white indicator mark is in front and raise until the key at its base passes through the key hole and turn knob at 90° to rest on top.

Wind transfer piston down quickly until resistance is felt on capstan.

Return transfer piston to original position and return red key to close off melt flow.

Release table clamp brace and remove mould.

Turn off machine and clean up area.

Safe Operating Procedure

STRIP HEATER

Students must read this important information before using the equipment

Has your teacher given you instruction on the safe use & operation of this equipment ?

Has your teacher given permission for you to use this equipment ?

Approved safety glasses *must* be worn at all times in all ITD workspaces.

Appropriate protective footwear with substantial uppers *must* be worn in all ITD workspaces.

Protective cotton gloves *must* be worn when using this equipment.

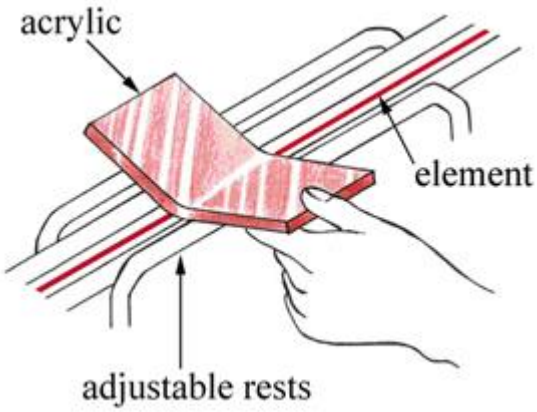
A suitable workshop apron is encouraged.

PRE-OPERATIONAL SAFETY CHECKS

1. Examine the power lead & heater for obvious damage.
2. Check there is no foreign matter in the element channel.
3. Ensure that the adjustable rests are in place, that they are correctly spaced to suit the thickness of material to be bent, and that they provide the desired heating zone for the bending profile.
4. Only use the strip heater for approved plastics eg acrylic.
5. Ensure that the cord does not create a slip/trip hazard.
6. Ensure the workspace is well ventilated.

Safe Operating Procedure

STRIP HEATER



OPERATIONAL SAFETY CHECK

Never operate a faulty Electrical Power Tool

– Report it to your teacher –

12. Turn on to pre-heat the heater element for10 mins prior to use.
13. Always wear safety glasses and cotton gloves that are
14. resistant to high temperatures to protect against burns.
15. Regularly check the heating element for build-up of dust or waste such as saw-dust. Invert heater carefully and allow foreign waste to fall away (when unplugged).
16. Before heating and bending any thermoplastic material, remove all protective paper from both sides.
17. Accurately mark the desired position for the bend with a felt marker or china-graph pencil so marks can be removed later.
18. Support the material to be heated. Use the outrigger support where fitted or other appropriate supports.
19. A thermoplastic workpiece with a material thickness > 5 mm, may need to be turned over after one minute to ensure even heating and to improve the desired profile.
7. Turn off and wait until the element has completely cooled before storing the strip heater away correctly.
20. Children often show curiosity towards the operations of the strip heater. Never leave the strip heater unattended when still switched ON or when still HOT.
21. Leave the strip heater unplugged when not in use.

Paper / cloth must NOT touch the HOT element

HOUSEKEEPING

1. Switch off, unplug & allow to cool down before storing.
2. Leave the work area in a safe, clean, & tidy condition.

POTENTIAL HAZARDS AND RISKS

- Hot element & surfaces
- Electricity
- Burns
- Slip & trip
- Eye injuries
- Toxic fumes
- Fire

STANDARD OPERATING PROCEDURE

PLASTICS WELDING GUN

Safety

Check the welding gun and the power cord for signs of damage. Report any faults to the teacher.

Keep the power cord and the hands clear of the heat shield.

When switching on the welding gun, hold it firmly to counter any sudden movement due to torque.

To close down a welding gun fitted with a cooling setting, switch off the heating element and then allow the fan to run for sufficient time to cool down the element and the heat shield before disconnecting from the power outlet.

Return the welding gun to its storage place only after it has cooled down.

When not in use, place the welding gun on the rest away from the edge of the bench.

Ensure that the nozzle is never directed towards flammable materials, the power cord or parts of the body.

Never operate the welding gun in damp conditions or in the vicinity of flammable vapours.

FIXED+ STATIC PLANT

SAFE OPERATING PROCEDURES

BUFFING MACHINE

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission

Safety glasses must be worn at all times in work areas.

Long and loose hair must be contained or restrained.

Appropriate footwear with substantial uppers must be

Close fitting or protective clothing or a workshop apron is

Rings and jewellery must not be worn.

Gloves must not be worn when using the Buffer.

Only one person may operate this machine at any one time.

PRE-OPERATIONAL SAFETY CHECKS

1. **Check workspaces and walkways to ensure no slip/trip hazards are present.**
2. **Locate and ensure you are familiar with the operation of the ON/OFF starter.**
3. **Both ends of the machine spindle must be covered at all times.**
4. **Use appropriate mop type and polishing compound for the task.**
5. **Faulty equipment must not be used. Immediately report suspect equipment.**

OPERATIONAL SAFETY CHECKS

1. **Never leave the machine running unattended.**
2. **Do not bend down near machine whilst it is running.**
3. **Use the front of the wheel only.**
4. **Work only below the centre of the spindle.**
5. **Small work must be securely supported with a wooden backing.**
6. **Work should be held so that edges cannot catch.**

HOUSEKEEPING

1. **Switch off the machine.**
2. **Leave the machine in a safe, clean and tidy state.**

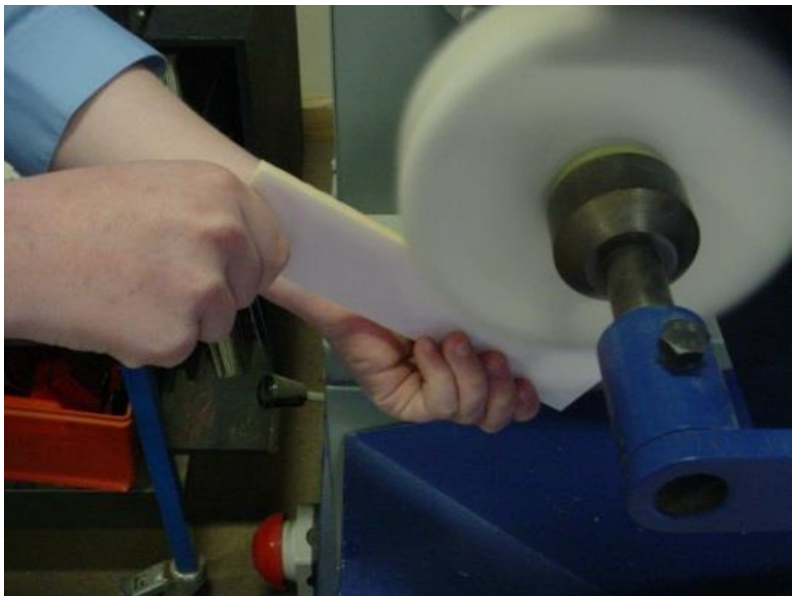
POTENTIAL HAZARDS

■ **Work can be snatched if improperly presented to buff** ■ **Hair or clothing entanglement in moving machine parts** ■ **Eye injuries**

FORBIDDEN

■ **Holding work with gloves, apron, material or clothing**

■ **Working on the side of the mop**



USING BUFFING MACHINE

Department of Education, Training and Employment

PORTABLE PLANT +EQUIPMENT

SAFE OPERATING PROCEDURES

HAND DRILL

Department of Education, Training and Employment

PORTABLE PLANT +EQUIPMENT

SAFE OPERATING PROCEDURES

HAND DRILL

Students must read this important information before using the equipment

Has your teacher given you instruction on the safe use & operation of this equipment ?

Has your teacher given permission for you to use this equipment ?

Approved safety glasses *must* be worn at all times in all ITD workspaces.

Appropriate protective footwear with substantial uppers *must* be worn in all ITD workspaces.

A mask *must* be worn when excessive airborne dust is created.

Hearing protection *must* be worn when noise levels are identified as excessive.

Protective clothing or a suitable workshop apron is encouraged.

Contain or restrain long & loose hair AND remove exposed rings or jewellery.

PRE-OPERATIONAL SAFETY CHECKS

8. Ensure this power tool has a suitable safe work area.
9. Examine the power lead and plug for obvious damage.
10. Do not use dull or damaged drill bits.
11. Check the selected drill bit is correctly fitted.

OPERATIONAL SAFETY CHECK

Never operate a faulty Power Tool

22. Do not connect to power source until all adjustments have been made.
23. Check that the power lead does not create a trip hazard and that it is well clear of the workpiece.
24. Examine the material to be drilled for splits, loose knots & nails, etc.
25. Select the correct sized drill bit. Tighten securely in the chuck.
26. Ensure the workpiece is secure & well supported in a convenient position for drilling.
27. The power drill must be held firmly with both hands to control operational accuracy and the rotational torque.
28. Keep hands and fingers well clear of moving parts. Avoid blocking & covering the motor ventilation slots with your hands.
29. Allow the drill to reach operating speed, then apply load gradually. Do not apply excessive force.
30. Back the drill bit out to clear away all waste.
31. Avoid prolonged use as this could overheat the motor. Turn off after backing out the drill bit. Do not place the drill down until the bit has stopped rotating.

Look before you drill – inspect for live wires

HOUSEKEEPING

3. Remove the drill bit & return tool to the storage cupboard.
4. Leave the work area in a safe, clean, & tidy condition.

POTENTIAL HAZARDS AND RISKS

- Moving & rotating parts
- Electricity
- Dust
- Noise
- Eye injuries
- Burns *(friction)*

STANDARD OPERATING PROCEDURE

PORTABLE POWER SAW

Safety

Use glasses and ear muffs.

Check the material for faults and defects.

Make sure work piece is securely held.

When not in use, before servicing, and when changing accessories such as blade, bit, cutter, or adjusting the setting of the saw, make sure it is disconnected from power source.

Don't over-reach. Keep proper footing and balance at all times.

Keep guards in place and in working order.

Never allow the lower guard to stay open.

Check to see that it closes briskly over saw blade.

Make sure cord is well away from cutting area.

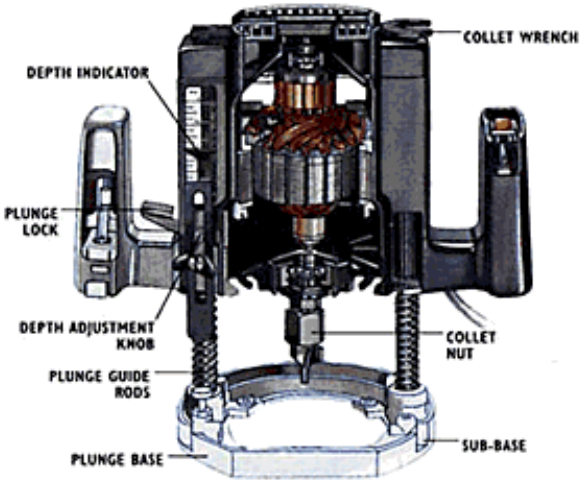
Do not start cutting until blade is at full speed.

Always hold saw with both hands.

Avoid kickback. This occurs when saw stalls rapidly and is driven backward. Release switch as quickly as possible.

STANDARD OPERATING PROCEDURE

PORTABLE ROUTER



Safety

Use glasses and ear muffs and consider a class P1 dust mask.

Check material for faults or defects.

Make sure work piece is securely held.

Fit cutter to machine and make all adjustments for depth of cut, guides and other attachments

before connecting to power source (see teacher first).

Remove keys or spanners from tool.

Hold router with both hands.

Keep fingers, hands and power cord clear of cutter.

Allow motor to attain full speed before use.

Keep sole plate pressed firmly on the work piece.

Turn motor off as soon as a cut is finished.

Do not place machine down until the cutter has stopped rotating.

On completion remove cord from power outlet, clean and store in safe place.

STANDARD OPERATING PROCEDURE

ROUTER LATHE/OVERHEAD ROUTER

Safety

Use face shield or safety glasses and ear muffs. Consider a class P1 dust mask.

Check material for faults and defects.

Make sure machine and area around machine is clear of waste materials, tools and people.

Fasten router lathe securely to a workbench or other stable structure.

Know and understand all safety instruction for the portable router.

Make all adjustments, changing of router bits and setting up of material in lathe before connecting to power source.

Do not force the router bit.

Move the router carriage from left to right towards headstock when cutting.

Leave machine in a safe and clean condition.

Never put hands under lathe area while turned on.

Always remove router lead from power source before removing material.

STANDARD OPERATING PROCEDURE

SPINDLE/BOBBIN SANDER

Safety glasses or face shield.

Consider a class P1 dust mask.

Check the condition of the sanding cylinder.

Check the adjustments of the table, collar and spindle nuts before starting the machine.

Make sure the area around the machine is clear of waste material, tools and people.

Ensure that the appropriate collar is used to ensure the smallest possible hole between the spindle and the table.

Allow machine to reach full speed before use.

Hold work piece to counteract the centripetal force (as well as the up and down forces) of the spindle, keeping hands well clear of the spindle

Do not attempt to sand small pieces held in hand. A suitable holding device must be used.

Keep all material flat on table at all times.

The table may be adjusted to suitable angles.

Keep the work piece moving when against the bobbin to avoid burning the work piece and/or

gumming up the sanding cylinder.

On completion, turn off the machine and the isolating switch.

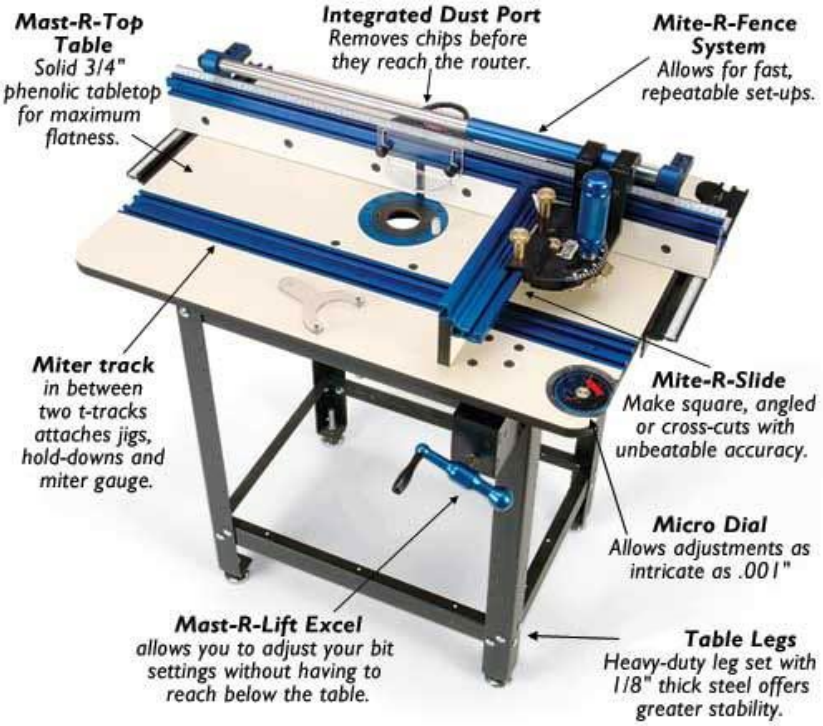
Ensure the machine and work area are left in a clean and safe condition.

Hold the work piece firmly against the bobbin, but do not press hard so as to burn the work piece

or destroy the abrasive material.

STANDARD OPERATING PROCEDURE

TABLE ROUTER



Safety

Use glasses and ear muffs. Consider a class P1 dust mask dependent on material being worked.

Make all adjustments to table and router before connecting to power source.

Use a guide attached to table or a ball bearing race on cutter.

Always consider the direction of rotation of the cutter/blade with regard to the feed direction.

Wait until blade has stopped spinning before clearing the table.

Always remove bit from router when finished.

Ensure work area is left in a safe and clean condition.

Keep hands away from router bit as bit is exposed at all times.

Always turn router off at machine as well as at the power points before making any adjustments or changing pieces of material.

STANDARD OPERATING PROCEDURE

VACUUM FORMING MACHINE

Type of machine/equipment:

Safety

Check the general condition of the machine.

Report any defects to the teacher.

Set up and clamp while the machine is turnedoff.

Set up the mould so that the free movement of the moving platen is not obstructed.

Ensure that the plastics material is securely clamped in position.

Before switching on the power supply, ensure that all controls are in their correct positions.

All guards must be in place.

Ensure that no other student is in the machine area.

Switch off the machine and release the air pressure before releasing the clamp and removing the work piece.

Keep hands clear of the clamping area, the moving platen and the heating element while the machine is operating.

Take care to ensure that the heater bank is moved away from the plastics material before degradation begins. Turn off the heater as soon as possible. Keep hands clear of the heater casing.

On completion of the work, disconnect the power cord from the power outlet and ensure that the

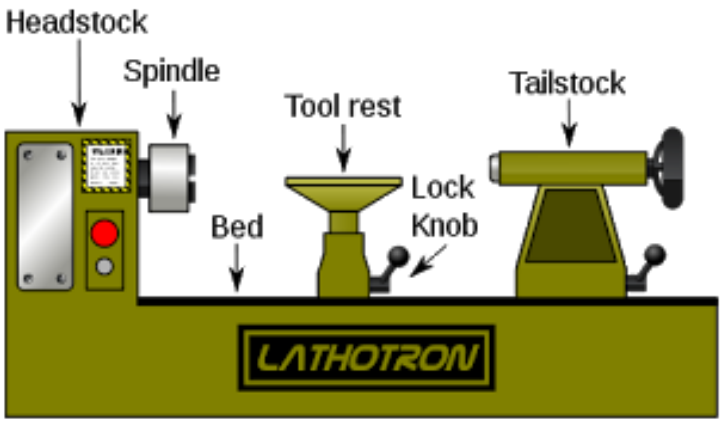
machine and the work area are left in a safe condition.

Compressed air should not be used to cool the work piece or to clean down the machine. Flying

particles are a serious hazard.

STANDARD OPERATING PROCEDURE

WOOD LATHE



Face shield (for preference) or safety glasses.

Consider a class P1 dust mask where fine dust is generated.

Carefully plan a working procedure.

Ensure that the timber is free from splits, cracks, loose knots or other defects.

Make sure that built up stock has been properly prepared and glued and that the glue has dried.

Be sure that stock is correctly mounted in the lathes.

Adjust the tool rest to the correct height as close as possible to the work piece and then clamp securely.

Set the spindle speed relative to the diameter of the material, the type of timber and required finish.

Check the sharpness of turning tools and the condition of the handles.

Make sure all guards are in place.

Grasp the turning tool firmly with both hands.

Stop the lathe when testing or measuring.

• Remove the tool rest before sanding or finishing.

STANDARD OPERATING PROCEDURE

WOOD LATHE

Post-Operation

• Ensure work area is left in a safe condition.

Additional Precautions

Use a suitable lubricant on the dead centre.

Check the tailstock adjustments regularly.

Turn work through one complete revolution by hand before starting.

Rough the material down to a cylindrical form before increasing speed.

Avoid "whip" or "chatter" in long material.

STANDARD OPERATING PROCEDURE

MIG WELDER

Students must read this important information before using the equipment

Has your teacher given permission for you to use this equipment ?

Approved safety glasses *must* be worn at all times in addition to a welding helmet.

Appropriate protective footwear with substantial uppers and rubber soles *must* be worn.

Protective welding helmet with the correct grade of UV lens *must* be worn.

Protective leather welding gloves *must* be worn when using this equipment.

Close fitting protective clothing or overalls, a leather apron & spats *must* be worn.

Rings & jewellery *must* NOT be worn when using any welding equipment.

PRE-OPERATIONAL SAFETY CHECKS

12. Ensure this MIG welder has a suitable safe work area.
13. Keep the area clean & free of grease, oils & flammables.
14. Ensure others are protected from any UV flash.
15. Ensure the area is well ventilated (with fume extraction).

STANDARD OPERATING PROCEDURE

MIG WELDER

OPERATIONAL SAFETY CHECK

Never operate a faulty Electrical Power Tool

32. Ensure the machine is correctly set up for current, voltage, wire feed and shielding gas flow rate.
33. Ensure that other workers in this locality are protected from any UV & IR radiation flash. Always close the UV curtain to the welding bay or erect a UV screen.
34. Ensure the welding return cable (earth) makes firm contact to provide a good electrical contact.
35. Ensure your workpiece has been prepared to be free of any paint, oxides or other surface finishes ensuring a good electrical contact.
36. Take particular care to avoid accidental UV welding flash to the skin or eyes.
37. Never leave the MIG welder running unattended.
38. Regularly inspect the welding tip and shield for damage.
39. When welding is finished or interrupted, turn off the shielding gas at the regulator, turn off the machine and secure the handpiece safely.

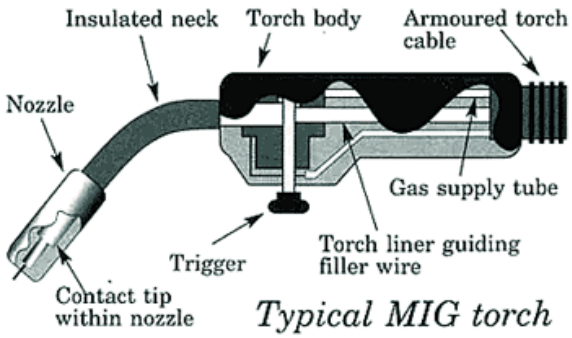
Work area must be dry to avoid electric shock

HOUSEKEEPING

5. Close the shielding gas bottle valve and regulator.
6. Ensure the welder and fume extraction are switched off.
7. Hang up the welding gun and hoses securely.
8. Leave the work area and welding bench in a safe, clean, and tidy condition.

POTENTIAL HAZARDS AND RISKS

■ Cuts & lacerations ■ Electricity & electric shock ■ Burns due to hot, molten materials ■ Flying sparks ■ UV radiation to skin & eyes ■ Toxic fumes ■ Fire & explosion



Typical MIG torch

STANDARD OPERATING PROCEDURE

MAGNA BEND

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.


Safety glasses must be worn at all times in work areas.


Long and loose hair must be contained.


Appropriate footwear with substantial uppers must be worn.


Close fitting/protective clothing must be worn.


Rings and jewellery must not be worn.


Gloves must not be worn when using this machine.

PRE-OPERATIONAL SAFETY CHECKS

1. **Guards or safety devices must never be removed or adjusted, except by an authorized person for maintenance purposes.**
2. **Working parts (ie. hinges) should be well lubricated and working surfaces kept free of rust and dirt.**
3. **Ensure no slip/trip hazards are present in workspaces and walkways.**

4. **Be aware of other personnel in the immediate vicinity and ensure the area is clear before using equipment.**
5. **Familiarise yourself with all machine operations and controls- refer to 'User Manual'.**
6. **Faulty equipment must not be used. Immediately report suspect machinery.**

OPERATIONAL SAFETY CHECKS

1. **Never use this machine for bending metal that is beyond the machine's capacity with respect to thickness, shape, or type. Refer to the manufacturer 'User Manual'.**
2. **Never attempt to bend rod, wire, strap, or spring steel sheets in this machine.**
3. **Adjust for thickness of workpiece – rotate adjusters either end of clampbar.**
4. **Insert workpiece and align bending edge of clampbar & bending-beam with the bend line of the workpiece.**
5. **Press and hold the 'START' button (this applies pre-clamping pressure to the workpiece).**
6. **Using other hand lift handle (this applies full clamping) and continue bend to required angle.**
7. **Keep clear of moving handles and bending-beam.**
8. **Slotted or short clampbars should be used for bending box shapes – refer to 'user manual'.**

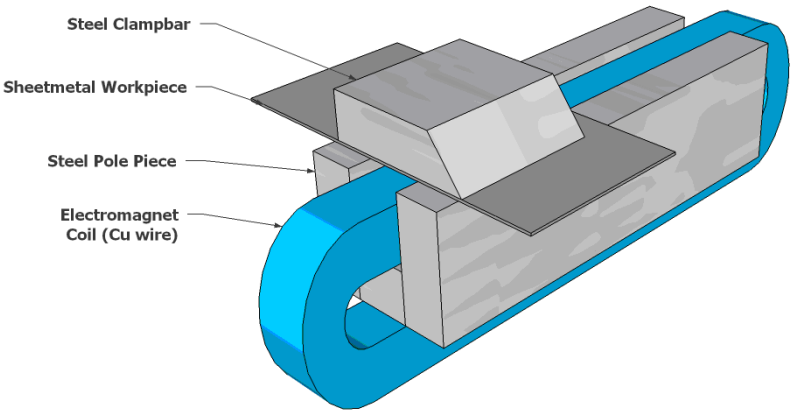
HOUSEKEEPING

4. **Ensure machine is turned off after use.**
5. **Return all accessories to storage racks.**
6. **Leave the work area in a safe, clean and tidy state.**

POTENTIAL HAZARDS

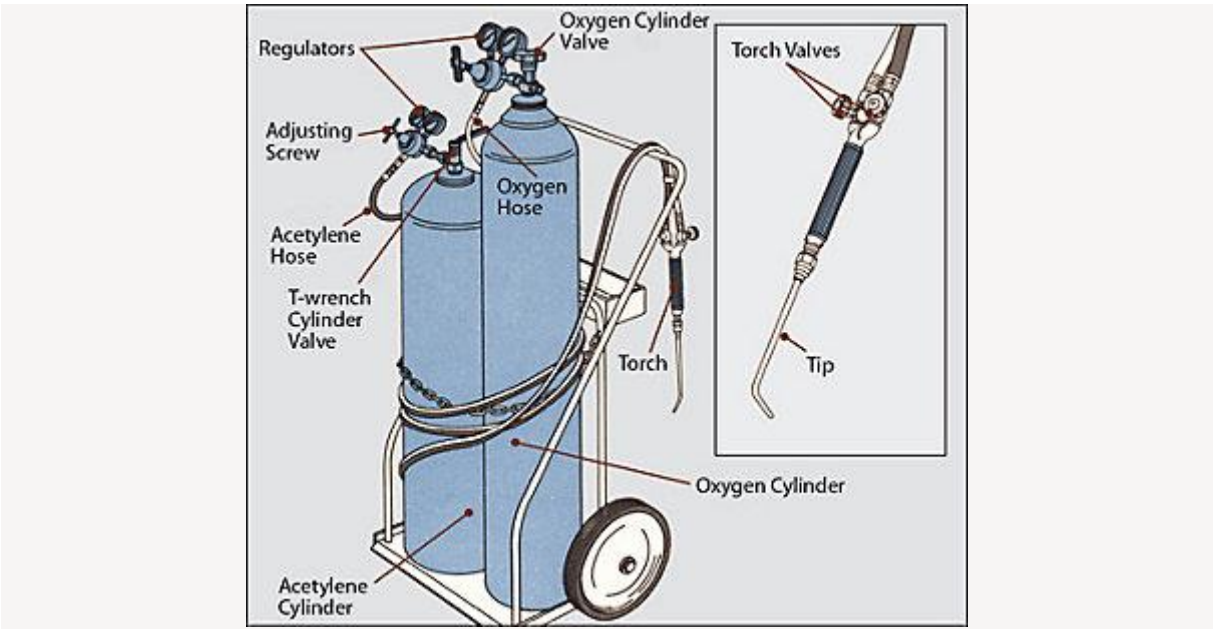
- **Sharp edges and burrs**
- **Impact from handles or bending-beam**
- **Squash/crush and pinch points**
- **Electrical & electromagnetic energy**

MAGNA BEND



STANDARD OPERATING PROCEDURE

Oxygen / Acetylene Plant



DO NOT use this equipment unless a teacher has instructed you in its safe use and operation and has given permission.

Welding goggles must be worn at all times in work areas.

Long and loose hair must be contained.

Appropriate footwear with substantial uppers must be worn.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Oil free leather gloves must be worn when welding.

STANDARD OPERATING PROCEDURE

Oxygen / Acetylene Plant

PRE-OPERATIONAL SAFETY CHECKS

7. **Ensure no slip/trip hazards are present in workspaces and walkways.**
8. **Keep area clean and free of grease, oil and other flammable material.**
9. **Gas hoses must be in good condition and not create a tripping hazard.**
10. **Before lighting up make a visual inspection of all equipment for damage.**
11. **Check that the area is well ventilated and fume extraction unit is on.**
12. **Faulty equipment must not be used. Immediately report suspect equipment.**

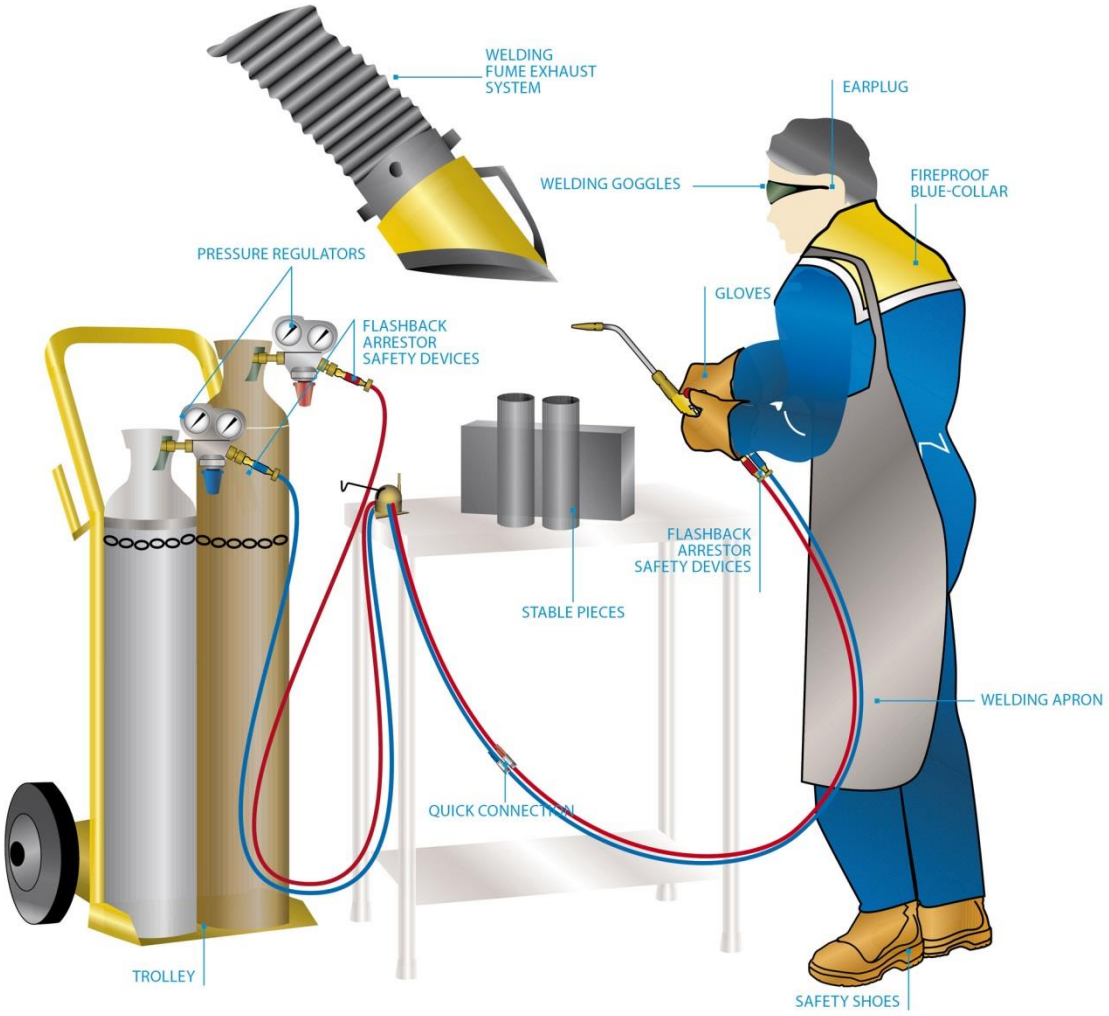
PRESSURE SETTING

1. **Check that the oxygen and acetylene regulator adjusting knobs are loose.**
2. **Check that both blowpipe valves are closed.**

3. **Slowly open the cylinder valves on each cylinder for half a turn only.**
4. **Screw in the regulator adjusting knobs slowly until the delivery pressure gauges register 70kPa.**
5. **Purge and check for constant oxygen gas flow.**
   - **Open the oxygen blowpipe for 2 seconds valve and check the delivery gauge.**
   - **If necessary re-adjust the oxygen regulator to achieve a 70kPa pressure.**
   - **Close the oxygen blowpipe valve.**
6. **Purge and check for constant acetylene gas flow.**
   - **Open the acetylene blowpipe valve for 2 seconds and check the delivery gauge.**
   - **If necessary re-adjust the acetylene regulator to achieve a 70kPa pressure.**
   - **Close the acetylene blowpipe valve.**

STANDARD OPERATING PROCEDURE

Correct and safe oxygas welding station



LIGHTING UP

1. **Open the acetylene blowpipe valve slightly and light the blowpipe with a flint lighter.**
2. **Continue to slowly open the acetylene valve until the flame no longer produces soot.**
3. **Slowly open the oxygen blowpipe valve until a neutral flame is produced.**

SHUTTING OFF BLOWPIPE

1. **Close the acetylene blowpipe valve first.**
2. **Then close the oxygen blowpipe valve.**

CLOSING DOWN

1. **Close down both cylinder valves.**
2. **Open oxygen blowpipe valve to allow the gas to drain out.**
3. **When oxygen gauges read zero, unscrew regulator-adjusting knob.**
4. **Close oxygen blowpipe valve.**
5. **Turn off acetylene cylinder valve.**
6. **Open acetylene blowpipe valve and release gas.**
7. **When acetylene gauges read zero, release regulator adjusting knob.**
8. **Close acetylene blowpipe valve.**

HOUSEKEEPING

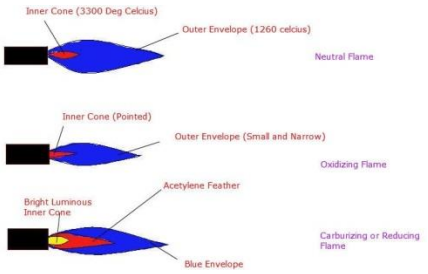
7. **Hang up welding blowpipe and hoses.**
8. **Turn off fume extraction.**
9. **Leave the work area in a safe, clean and tidy state.**

POTENTIAL HAZARDS

- **Burns**
- **Flying sparks**
- **Fumes**
- **Flashbacks**
- **Radiation damage to eyes**
- **Explosion**

FORBIDDEN

- **Lighting blowpipe with matches or lighters**
- **Using oil, grease or other hydrocarbons**
- **Using oxygen as a substitute for compressed air**



STANDARD OPERATING PROCEDURE

Metal Cold Saw

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.


Safety glasses must be worn at all times in work areas.

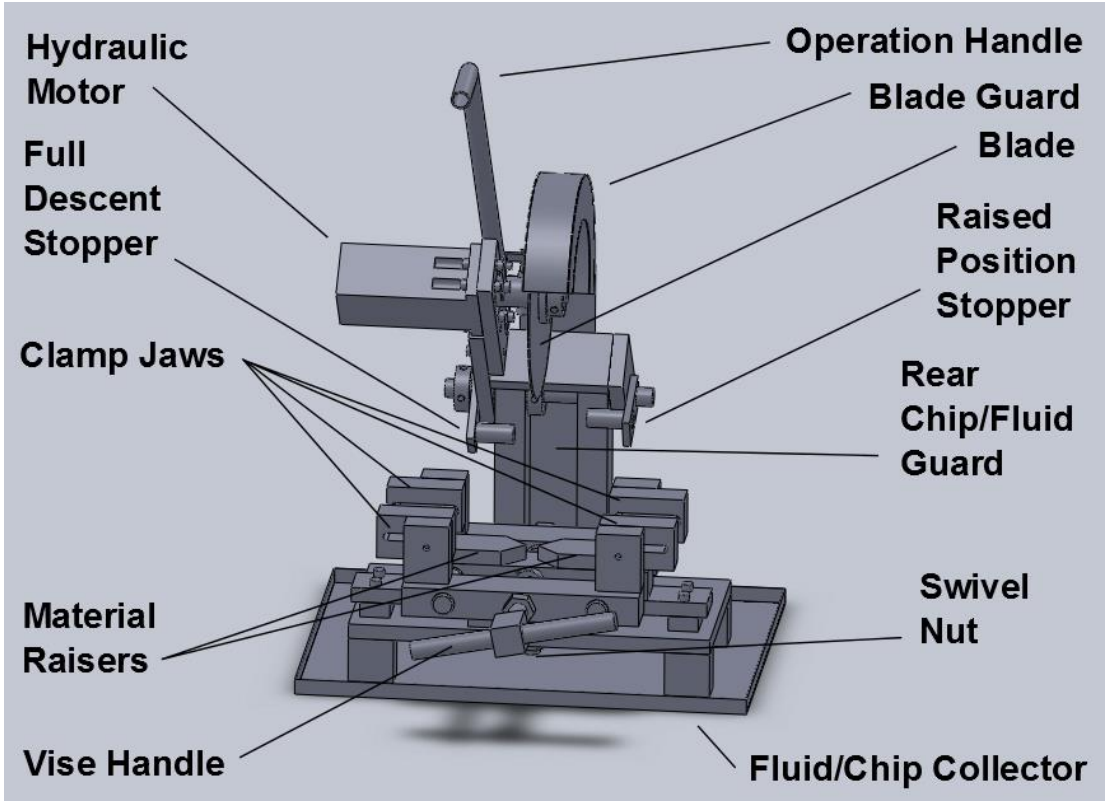

Long and loose hair must be contained.


Sturdy footwear must be worn at all times in work areas.


Close fitting/protective clothing must be worn.


Rings and jewellery must not be worn.


Hearing protection must be worn when using this machine.



STANDARD OPERATING PROCEDURE

Metal Cold Saw

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspaces and walkways to ensure that no slip/trip hazards are present.
2. Ensure saw blade is in good condition.
3. Locate and check the operation of the ON/OFF starter.
4. Check that all safety guards are in working order.
5. Check the operation of the work vice.
6. Check coolant delivery system to allow for sufficient flow of coolant.
7. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

1. Ensure that the work piece is securely held in the work vice.
2. Support overhanging work and signpost if it presents a hazard.
3. Never leave the machine running unattended.
4. Attention must be paid to unusual noises during the sawing process.
5. Never force the saw into the workpiece. Use a slow and even feed rate.
6. Before making adjustments or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.
7. Immediately absorb any coolant spills.

HOUSEKEEPING

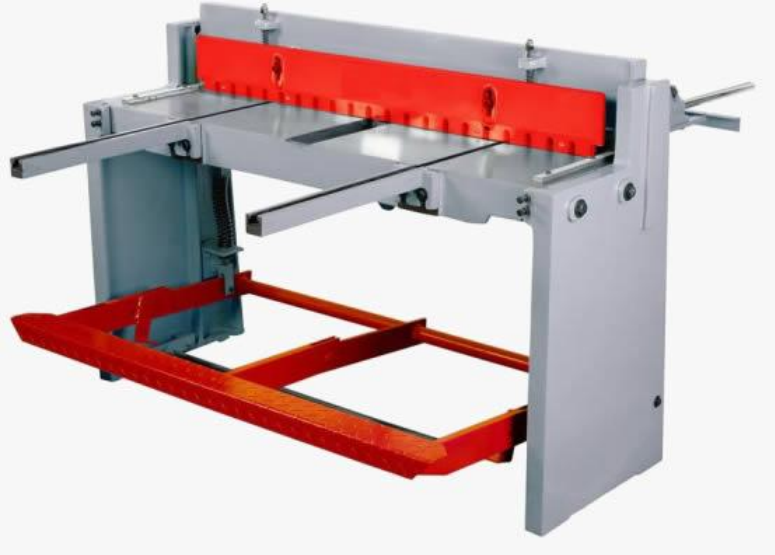
1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Possible skin irritation from coolants
- Eye injuries
- Sharp edges and burrs - metal splinters
- Noise

FORBIDDEN

- Attempting to cut very small items



SAFETY OPERATING PROCEDURES

Metal Cutting Guillotine

DO NOT use this machine unless a teacher has instructed you in its safe use and operation and has given permission.

Safety glasses must be worn at all times in work areas.

Long and loose hair must be contained.

Sturdy footwear must be worn at all times in work areas.

Close fitting/protective clothing must be worn.

Rings and jewellery must not be worn.

Gloves must not be worn when using this machine.

Only one person may operate this machine at any one time.

STANDARD OPERATING PROCEDURE

Metal Cutting Guillotine

PRE-OPERATIONAL SAFETY CHECKS

13. Ensure fixed guards are in place to prevent hands or other parts of the body from entering the trapping space.
14. Guards or safety devices must never be removed or adjusted, except by an authorized person for maintenance purposes.
15. Working parts should be well lubricated and free of rust and dirt.
16. The area around the machine must be adequately lit and kept free of materials, which might cause slips or trips.
17. Be aware of other personnel in the immediate vicinity and ensure the area is clear before using equipment.
18. Familiarise yourself with and check all machine operations and controls.
19. Ensure cutting table is clear of scrap and tools.
20. Faulty equipment must not be used. Immediately report suspect machinery.

OPERATIONAL SAFETY CHECKS

1. Do not attempt to cut material beyond the capacity of the machine.
2. Never attempt to cut rod, strap or wire with this machine.
3. Use correct lifting procedures when handling large sheets of material.
4. Take extreme care during the initial feeding of the workpiece into the machine.
5. The workpiece should always be held sufficiently far back from the edge being fed into the guillotine.
6. Ensure fingers and limbs are clear before actuating the guillotine.
7. Hold material firmly to prevent inaccurate cutting due to creep.
8. When cutting ensure feet are positioned to avoid contact with the foot operated lever.

HOUSEKEEPING

10. Remove all off cuts and place them in either in the storage rack or waste bin.
11. Leave the work area in a safe, clean and tidy state.

POTENTIAL HAZARDS

■ Sharp edges and burrs ■ Crush and pinch points ■ Manual handling sheets

STANDARD OPERATING PROCEDURE

Soldering

Students must read this important information before using the equipment

Has your teacher given you instruction on the safe use & operation of this equipment ?

Has your teacher given permission for you to use this equipment ?

Approved safety glasses *must* be worn at all times in all ITD workspaces.

Appropriate protective footwear with substantial uppers *must* be worn in all ITD workspaces.

Prevent fumes from breathing zone of operator or use a suitable P2 or P3 filter mask.

A suitable workshop apron and cotton gloves are advisable.

PRE-OPERATIONAL SAFETY CHECKS

16. Examine the power lead & machine for obvious damage.
17. Ensure that the cord does not create a slip/trip hazard.
18. Ensure the workspace is well ventilated to prevent fumes in the breathing zone eg. use in open area with cross ventilation or with fume extraction system.
19. Check condition of soldering tip. Replace if damaged.
20. Ensure tip is 'tinned' & free from waste build-up. Once the tip has warmed-up, wipe on a damp sponge to clean.
21. Leave the soldering iron in the stand when warming up.
22. Never leave a soldering iron unattended when turned on or still hot. Leave unplugged when not required.

STANDARD OPERATING PROCEDURE

Soldering

OPERATIONAL SAFETY CHECK

Never operate a faulty Power Tool

– Report it to your teacher –

40. Do not plug in and turn on until the tip element has been checked, or replaced and tightened.
41. Never touch the soldering tip. Keep your fingers clear.
42. Always wear safety glasses. Smoke and hot embers can often result when soft soldering.
43. Avoid positioning your head directly over the soldering process. Soldering often creates fumes that can be toxic.
44. Avoid prolonged use. This could overheat the tip element causing it to fail or oxidise.
45. Always allow the soldering iron to reach the desired temperature. This can take several minutes.
46. Ensure electrical cords are well clear of the soldering process. Do NOT touch electrical cords with the tip.
47. Wash your hands after using solder – many soft solders contain toxic lead products.
48. Never leave the machine unattended when still switched ON or when switched OFF but still HOT.
49. Turn off and wait until the tip element has completely cooled before storing the machine away correctly.

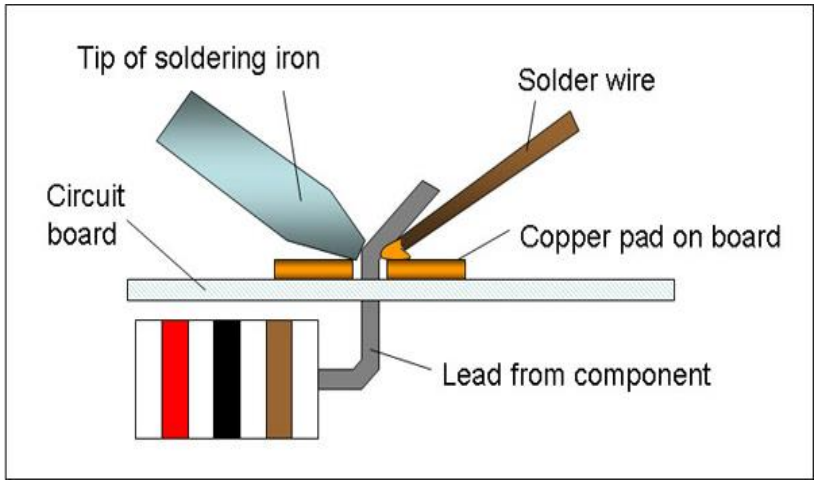
NEVER flick the iron to remove excess solder

HOUSEKEEPING

9. Switch off, unplug & allow to cool down before storing.
10. Leave the work area in a safe, clean, & tidy condition.

POTENTIAL HAZARDS AND RISKS

■ Hot element, surfaces ■ Burns ■ Electricity ■ Eye injury ■ Toxic fumes ■ Trip & slip ■ Fire



SAFETY OPERATING PROCEDURES Angle Grinder

Safety glasses must be worn at all times in work areas.

Appropriate footwear with substantial uppers must be worn.

Rings and jewellery must not be worn.

Long and loose hair must be contained.

Close fitting/protective clothing must be worn.

Hearing protection must be worn when using this machine.

(Portable Equipment)

DO NOT use this power tool unless a teacher has instructed you in its safe use and operation and has given permission.

SAFETY OPERATING PROCEDURES Angle Grinder

PRE-OPERATIONAL SAFETY CHECKS

1. Use only in designated grinding area – erect screens if necessary.
2. Examine the power cord, extension lead, plugs, sockets and power outlet for damage.
3. Ensure that the grinding disc, guard and attachments (including handle) are secure and correctly fitted.
4. Inspect the grinding disc for damage. Do not use damaged grinding disc.
5. Always inspect the work piece to ensure that there aren't any items which might damage the grinding wheel or cause injury to the operator.
6. Secure and support the work piece using clamps, bench vices, etc.

OPERATIONAL SAFETY CHECKS

50. Ensure all other students are clear of the immediate work area.
51. Keep fingers and hands & power cords clear of the grinding disc.
52. Never make adjustments while the angle grinder is running.
53. Do not switch off the angle grinder when it is under load, except in an emergency.
54. Allow angle grinder to reach operating speed before applying to work piece & increase load gradually.
55. Do not lift or drag angle grinders by the cord.
56. Keep flexible electrical cords clear of oil, grease, machines and sources of heat.
57. Be aware of flying sparks. Hold grinder so that sparks fly away from you, other people and flammable materials.
58. Do not leave the angle grinder running & only use the grinder when hand held.
59. Do not touch the work piece immediately after grinding operation as it may be extremely hot.

HOUSEKEEPING

2. Avoid trip hazards & prevent damage to electrical cord/s.
3. Do not walk on, wheel objects over, or drop materials / tools on flexible electrical cords.
4. Clean bench and work area & place all waste material in bin.
5. Return angle grinder & rolled up extension leads to storage area.

POTENTIAL RISKS AND HAZARDS

- Moving and rotating parts
- Inhalation of fumes and dust particles
- Electrocution from power faults, faulty equipment or incorrect use