

# Procedure for Safe Use of Band Saws

Palmerston North Region, Massey University

Prepared by: Andrew Scuffham, Office of the Principal

Date issued: August 2003

Review date: August 2005

1	Purpose.....	1
2	Responsibility.....	1
3	Introduction.....	1
4	Training .....	2
5	Hazards.....	2
6	Locking the bandsaw.....	3
7	Preparation.....	3
8	Personal Protective Equipment .....	3
9	Procedures .....	4
10	Changing blades .....	4
11	Emergency Procedures .....	6
12	References .....	6
13	Appendix 1 .....	7
	Basic safety rules.....	7
14:	Appendix 2:.....	8
	Massey University Bandsaw safety training checklist: .....	8

## 1 Purpose

This document is designed to assist with the safety of staff and students when using a band saw.

## 2 Responsibility

It is the responsibility of each staff member to ensure their own safety and the safety of others and that no action or inaction will cause harm to themselves or others.

As in compliance with Massey University policy, the Supervisor or the Manager are to ensure that those employees or students under their control are trained sufficiently in the tasks that are being undertaken. This is also to include preparation for emergencies and correct use of personal protective equipment.

It is the responsibility of each member of staff authorised to use the bandsaw to ensure their own safety and the safety of others by ensuring that no action or inaction on their part will cause harm to themselves or others.

## 3 Introduction

Band saws are used for cutting bone and tissue for dissection or to make the size of animal carcasses or cadavers manageable for handling. They are also used in a workshop situation.

- 3.1 The bandsaw is used for cutting various anatomical specimens including:
- isolated bone
  - bone and soft tissues (unpreserved)
  - bone and soft tissues (unpreserved; frozen)
  - bone and soft tissues (preserved)
  - bone and soft tissues (preserved; frozen)
  - soft tissues (frozen)
- 3.2 The bandsaw is also used for cutting wood, plastics and other materials in a traditional workshop or part of a training situation.
- 3.3 This document is a generic document and should be used to as a guideline for each Department/ Institute/ Section or School to develop their own protocol for their individual bandsaw.

## 4 Training

Only operators trained in the safe operation of a band saw are allowed to use the saw. The training should be documented, including the level of competence. The records must include the trainer details and date of training. Please see appendix 2 for a training checklist.

## 5 Hazards

- Blunt blades
- Blades snapping
- Removal and disposal of blades
- Wear on blade creating a catching surface
- Unguarded blades
- Unguarded drive mechanisms
- Trapping of mesh gloves in teeth of saw
- Trapping of clothing or jewellery in teeth of saw
- Accumulation of cut meat or materials on tray limiting workspace
- Repetitive work resulting in OOS
- Manual handling injuries
- Electrical shock
- Bumping of bandsaw operator by adjacent people or others passing by.

### 5.1 *The outcomes of the hazards include:*

- The band saw may result in major lacerations and accidental amputation from slipping onto moving blade
- Bone fragments or animal material splashed into the face of the operator resulting in eye damage or the inhalation of particles.
- Musculoskeletal damage from positioning or lifting material
- Noise damage
- Eye damage
- Distraction

## **6 Locking the bandsaw**

All bandsaws are required to be locked when not in use, unless (1) the bandsaw is in a locked room with limited access, and it can be guaranteed that only those who use the room are trained operators, or (2) removing the blade and locking the blade away from the bandsaw, this should only be used when it is not practicable to lock the bandsaw.

## **7 Preparation**

- The floor area around the bandsaw should be kept clear of obstructions, and the surface of the floor should not be slippery
- No employee authorised to use the bandsaw should operate it when alone.
- The electrical connection is to be unlocked immediately before use and padlocked immediately after use. Only those personnel trained to use the saw have the key or combination.
  
- The bandsaw blade should be checked for correct tension and serviceable condition before operation of the bandsaw.
- The operator must know the exact location of the bandsaw off switch and /or the emergency power disconnect.
  
- The doors guarding the top and the bottom driven wheels of the bandsaw must be firmly closed during operation of the bandsaw.
  
- The wheels of the band saw (upper and lower) must be fully enclosed.
  
- Off-cuts of animal tissues generated during cutting should be cleared from the bandsaw table and placed in a nearby waste bin (away from the operator) as they are produced, and not left to accumulate on the table where they could interfere with the safe operation of the saw.

## **8 Personal Protective Equipment**

- Remove or fasten any loose clothing.
- Remove any jewellery.
- Roll loose sleeves above the elbows.
- Long hair is to be tied up or a hat to be worn.
- Covered protective footwear to be worn (i.e. no open footwear)
- A face shield should be worn by the operator when handling anatomical specimens where there is a potential for exposure to biological hazards by inhalation or ingestion. This is mainly required for risk group 2 organisms as per NZS 2243:3, 2002. Appropriate mask or respirator should be worn by operator when cutting preserved material or material which may pose a significant biological hazard
- Tight fitting latex, nitrile or rubber gloves should be worn if there is a risk of exposure to biological hazards or if the material has been fixed in formalin.

## 9 Procedures

- A bandsaw should never be operated with a dull or improperly tensioned blade. It should be removed from service immediately before causing material to stick, jam or kickback during operation of the saw.
- Cracked saw blades must not be used. A "click" as the blade passes through the work may indicate a cracked blade.
- A saw to which blood or bone has adhered should be cleaned immediately. The bandsaw must be turned off before cleaning the blade.
- The adjustable guard should be kept as close over the point of operation as the work permits.
- Wheel guard doors must be closed and the blade properly adjusted before turning the machine on.
- Allow the saw to reach full speed before feeding the work.
- Maintain a 10 cm (4 inch) margin of safety. This means that the hands should always be at least 5cm (2 inches) away from the blade when the saw is turned on.
- Use a push stick (either wooden or plastic) if it is required to get close to the blade.
- Disconnect electrical power when changing blades or any time that an injury could occur if the machine is accidentally turned on. Generally this requires that the machine be unplugged or the circuit breaker turned to the off position.
- Never place your hand or fingers directly in line with the blade.
- Cleaning and maintenance of blades should include the top and bottom pulleys and any scrapers.
- The pulleys are required to be covered when in operation.
- The teeth of the blades should be facing downwards in the direction of blade movement.
- Handling of frozen meat and bones is limited in time to avoid loss of feeling and dexterity in hands and fingers due to the cold.
- Regular breaks should be taken to avoid loss of concentration and boredom.
- Only use saw if undivided attention can be paid to saw operation.

## 10 Changing blades

The following is an account of the procedures involved in changing a bandsaw blade, either because it is dull or because it is broken. In both cases, the bandsaw should be switched off, the power disconnected, and both driven wheels should have come to rest - BEFORE THE INSPECTION DOORS ARE OPENED AND WORK COMMENCES. To avoid injury to hands when handling an old or a replacement blade, it is recommended that leather gloves should be worn .

### 10.1 *BLADE REMOVAL*

#### 10.1.1 **Broken blade**

Open inspection doors and carefully extricate the blade from the driven wheels and guides. Once the blade has been removed, it should be coiled up, secured with

string to prevent uncoiling, and then placed in a labelled container for later disposal or return to manufacturer for welding and resharpening.

### **10.1.2 Dull blade**

Release blade tension by rotating the tensioner wheel in a clockwise until the blade has 2-3 cm of side-side runout - measured at a position halfway vertically between the bandsaw table and the bottom of the adjustable guide bar (set at its lowest position). Open inspection doors and carefully extricate the blade from the driven wheels and guides. Once the blade has been removed, it should (as for a broken blade) be coiled up, secured with string to prevent uncoiling, and then placed in a labelled container, for later disposal or return to manufacturer for welding and resharpening.

## **10.2 BLADE REPLACEMENT**

### **10.2.1 Blade Specification**

Blade specification is expressed in terms of:

- (a) length
- (b) width
- (c) teeth per unit length

The specification of the blade selected should depend on the composition of the material to be bandsawed. In general terms, the greater the proportion of bone in the specimen, the higher the number of teeth per unit length of blade required.

The specification for a general purpose "meatsaw" blade which is suitable for sectioning a specimen with similar amounts of bone and soft tissue is:

Length = 3350mm (11 feet 2 inches)

Width = 12.5 mm (1/2 inch)

Teeth per 50mm = 8 (Teeth per inch = 4)

### **10.2.2 Orientation of blade**

The new blade will be coiled for ease of storage and transport. Remove ties and carefully unravel the blade. Examine blade to orientate for correct installation – ensure that the teeth should be pointing in the direction of travel of the blade (anticlockwise as viewed by the operator)

### **10.2.3 Installation of blade**

With the blade orientated the correct way, and the inspection doors open, position the blade over the top and bottom driven wheels in turn, and then locate the blade between the blade cleaners and the top and bottom blade guides. When this is done, begin tensioning the blade by turning the tensioner wheel in a counterclockwise direction. Continue turning the tensioner wheel until the blade has 3 - 5 mm movement either side of the blade resting position - measured at a point vertically halfway between the bandsaw table and the bottom of the adjustable guide bar (set at its lowest position).

Rotate the top driven wheel manually through one complete revolution to verify that the blade is seated correctly on the driven wheels, is located correctly in the guides and between the blade cleaners.

The adjustable guide bar should be set at the lowest position which safely allows the passage of the specimen being sectioned.

Finally, close both inspection doors.

## 11 Emergency Procedures

When a band breaks, shut off the machine and stand clear until the machine has stopped.

In case of accident turn the band saw off at the machine or the wall. Call for first aid assistance and apply first aid. Seek medical attention or ambulance if required.

In case of amputation, locate the amputated part (finger) and place a clean cloth or protection over the finger and then place within ice. Do not place amputated part or finger directly in ice.

## 12 References

Mariano Ramirez Jr., Steve Ward, Peter Kolasinski. *Industrial Design Laboratory Safety Manual For Students* (2003). Industrial Design Program, Faculty of the Built Environment University of New South Wales

<http://www.fbe.unsw.edu.au/staff/Mariano.Ramirez/IDLabManual2003.pdf>

Health and Safety Executive. HSG 45. Safety in meat Preparation: Guidance for butchers.

National Guidelines for health and safety in the meat industry. Australasian Meat Industry Employees Union and the Meat and Allied Trades Federation of Australia (1995). Meat and Livestock Australia.

Standards Australia and Standards New Zealand (2002). AS/NZS 2243:3 2002. Safety in Laboratories, Part 3: Microbiological aspects and containment facilities. Author: Wellington.

Workshop techniques. <http://www.herts.ac.uk/lis/ltdu/projects/mm2/bandsaw/>

## 13 Appendix 1

### Basic safety rules

MASSEY UNIVERSITY BANDSAW SAFETY Guidelines:

August 2003

#### Before starting and using the saw:

- Secure hair and remove jewellery.
- Always disconnect the machine from power before adjusting the guides or replacing the blade.
- The guard should be as low as possible for the job being done.
- Make sure blade is tensioned properly for its width.
- Verify that the blade guides are properly positioned and that the blade is sharp.
- Ensure undivided attention can be paid to operating saw.

#### While using the saw:

- Don't begin cutting until the bandsaw reaches full speed.
- Maintain a well balanced stance.
- Use a wooden or plastic push stick to handle small items. The push stick should do all feeding of stock into the blade.
- Hold stock firmly to the table while cutting.
- Do not back out of cuts as this may pull the blade off.
- Never try to pick pieces (wood, bone etc) out of the table slot while the saw is operating.
- A rhythmic click usually indicates a cracked blade. Stop the machine and check.
- If the blade breaks, shut the machine off and allow it to come to a complete stop. Never try to free the blade while the wheels are turning.
- Don't have your fingers in line with the blade as you feed material into the bandsaw.
- Always keep your hand at least 50 mm (2") away from the blade. Use a push stick if you need to get closer.
- Don't twist the blade when cutting curves. Cut curves gradually. Make sure the radius of your cut is not too small for the width of the blade.
- Don't stop the machine with the saw in the cutting process.
- Only use bandsaws with the proper guards in place. The front guard must cover the exposed portion of the blade. With the power cut off, adjust the frontal guard as close as possible to the material being cut, approximately 12 mm (½ inch) above it.
- Don't leave the bandsaw after you finish without shutting it off and making sure the blade has come to a complete stop.

**14: Appendix 2:  
Massey University Bandsaw safety training checklist:**

Item	Initials
<b>Bandsaw hazards</b> <ul style="list-style-type: none"> <li>➤ Snapping blades (listen for a tell-tale clicking)</li> <li>➤ Fitting and removal of the blade</li> <li>➤ Mesh gloves getting caught by blade teeth</li> <li>➤ Trapping of loose clothing, jewellery, or hair</li> <li>➤ Operator being bumped by others</li> <li>➤ Distractions (talking, movements, etc)</li> <li>➤ Electric shock</li> <li>➤ OOS</li> </ul>	
<b>Location of keys and/or combination lock</b> <ul style="list-style-type: none"> <li>➤ Locking and unlocking of band saw</li> <li>➤ Authorised users</li> <li>➤ Combination lock number</li> <li>➤ Location of padlock key</li> </ul>	
<b>Preparation of area</b> <ul style="list-style-type: none"> <li>➤ Clear non-slip surface to stand on</li> <li>➤ Blade properly fitted (teeth facing down &amp; between cleaners) and tensioned</li> <li>➤ Doors firmly closed</li> <li>➤ Clear working platform on the saw</li> </ul>	
<b>Personal protective equipment</b> <ul style="list-style-type: none"> <li>➤ Use of gloves</li> <li>➤ Use of eye protection</li> <li>➤ Use of face shield</li> </ul>	
<b>Use of band saw</b> <ul style="list-style-type: none"> <li>➤ Ensure that others are present or know what you are doing</li> <li>➤ Have guard set as low as possible</li> <li>➤ Use a push-stick whenever possible</li> <li>➤ Do not have hands in line with the blade (keep them to the side)</li> <li>➤ Do not try to reverse an item out of a cut</li> <li>➤ Take regular breaks to avoid boredom an loss of concentration</li> </ul>	
<b>Changing blades</b> <ul style="list-style-type: none"> <li>➤ Recognition of dull blade</li> <li>➤ Blade removal</li> <li>➤ Blade specification</li> <li>➤ Orientation of Blade</li> <li>➤ Installation of blade</li> </ul>	
<b>Emergency procedures</b> <ul style="list-style-type: none"> <li>➤ Turn off the saw and stand clear</li> <li>➤ Know where the first-aid supplies are</li> <li>➤ Know who to contact or call</li> <li>➤ Know first aid procedures</li> </ul>	
<b>Cleaning of band saw</b> <ul style="list-style-type: none"> <li>➤ Cleaning equipment</li> <li>➤ Cleaning procedures</li> <li>➤ Use of gloves while cleaning</li> </ul>	

**Department/Institute/Section/ School**

**Date: ..../..../....**

Name of operator.....

Signed operator.....

Name of trainer.....

Signed trainer.....



