**Machinery and Plant**

**Meeting the University Standard**

**Guidance Information**

# Awareness People Equipment Workplaces

# Introduction

Workplaces within the University of Auckland vary widely in the **risks** they expose people to, from relatively benign offices and classrooms, to potentially hazardous **workshops** and plant rooms. The University has a duty of care to ensure that people are not harmed or affected by the University’s activities, and this can be achieved by trained and authorised people operating safe equipment in safe workplaces. The University’s Machinery and Plant Standard provides an overview of the requirements needed to safely work with **machinery** and **plant,** along with key definitions. This guidance is intended to enable supervisors and managers to meet the standard and provides links to useful information about machinery and plant.

# Building awareness

# What is machinery and plant?

**Machinery** is a collective term for machines and their parts. A machine is considered to be any powered apparatus that has interrelated parts and is used to perform work.

**Plant** is a much wider term that includes machinery, equipment, appliances, implements or tools and any component or fitting or accessory of these. It can include things as diverse as presses in a foundry, excavators and trucks in mining, and photocopiers in an office. It can range from electric drills, lifts, escalators, tractors and hand trolleys, to cranes, other lifting gear and welding gear.

*It is because of this definition that the Standard applies to almost all workplaces – not just machinery workshops and plant rooms.*

**Do I need to comply with the Machinery and Plant Standard?**

You must comply with the Standard if you are doing any work activity that involves the use of machinery or plant.

If your machinery or plant is potentially hazardous, a **risk assessment** must be carried out to determine the level of risk and to identify suitable **controls** to make the item safe to use.

The result of the risk assessment will determine whether extra controls are required. Items that are low risk, like computers, may require low levels of training so that people do not suffer long term adverse effects (such as wrist pain and other upper limb disorders), while complex machinery such as lathes and milling machines will require much greater levels of training, and possibly other controls; for example, machine guarding, emergency stop switches and supervision.

If the risk assessment shows that the risk of using a particular machine or item of plant is of high or extreme risk, that machinery or plant must either not be used at all, or not be used until extra controls can be put in place to reduce the level of risk to moderate or low.

**What about workshops?**

Workshops are workplaces, just like anywhere else, but are set up to manufacture, repair or service items with the use of machinery and plant. Because there are normally multiple hazards within a workshop, access to them must be properly controlled (so that unauthorised people do not wander about while machines are running).

**What about workplaces off campus?**

We still need to be safe when we are working away from the University. Whether we are taking core samples in a car park, or working in a vineyard with a tractor, we must make sure that we, and others, are not harmed by our activities.

**What if a contractor is doing work for me?**

Since this guidance is based on industry good practice, their processes should be similar to ours. At the very least, you should see them using personal protective equipment like safety glasses and ear muffs, and they should keep you and others away from their work area.

The University could be held responsible if a contractor we have hired has an accident, so if you see anyone working dangerously, please notify the University Health, Safety and Wellbeing team. They will check the work site and make sure the contractor complies with University standards. If you think the contractor’s work methods are really dangerous, you have the right to ask them to stop.

**What is a Safe Work Instruction?**

A **Safe Work Instruction** (SWI) is a simple, one page instruction sheet that is used to inform people of the basic information that is needed to safely operate an item of machinery or plant. SWIs should be readily available, and ideally should be laminated and posted close to the machines or items of plant that they refer to.

A library of SWIs for common machinery and plant is available on the Staff Intranet: Health, Safety and Wellbeing

A template is also available so that supervisors can develop their own SWIs if they obtain a new, unusual item.

SWIs should be reviewed after: any accident (including **incidents** or near misses); if the equipment it refers to is replaced or modified; and on a periodic basis (normally every five years after date of issue).

**Where can I get help with managing machinery and plant?**

Call the Health, Safety and Wellbeing team on 09-923-4896 (or ext 84896) or send them an email: [hsw@auckland.ac.nz](mailto:hsw@auckland.ac.nz). They will be happy to assist you.

# People

**Roles and actions – who does what**

People within, or associated with a workplace all have a role to play in ensuring the activities are carried out in a safe manner, even when the workplace has a low risk profile. Everyone must be aware of their particular role, and their responsibilities as detailed in the University Health and Safety Policy.

The specific roles that relate to machinery and plant are:

**Deans of faculties and directors of service divisions:**

Deans of faculties and directors of service divisions must be able to identify the workplaces they are responsible for.

Their responsibilities include those detailed in the University Health and Safety Policy, and in particular, they must:

* Ensure that a supervisor is assigned to each workplace that requires one.
* Ensure that supervisors are adequately trained and resourced to manage the workplaces that they are responsible for.
* Ensure that supervisors are consulted when planning the use of workplace resources, including the scoping of budgets, timelines, and student/visitor numbers.

**Supervisors:**

Supervisors are people who are deemed competent to instruct others on how to use machinery and plant that they are authorised to use, and who can supervise users (such as staff or students) who have not yet achieved the levels of competency required to be an operator. Where needed, a supervisor may be designated to be in charge of a workplace by their manager, director, or dean.

Their responsibilities include those detailed in the University Safety Policy for Line Managers and in particular:

* Maintaining workplace safety documentation in accordance with University policy, including carrying out risk assessments.
* Ensuring that the control measures identified in the risk assessments are implemented and continue to be effective.
* Ensuring that people within their remit receive induction, training, resources (including time), advice and support, and are supervised until deemed competent.
* Ensuring that that machinery and plant within their workplace is used or operated in a safe manner. If necessary, this includes enforcing workshop rules and procedures.
* Raising any issues of non-compliance through their line management structure.
* Ensuring that where the need for health monitoring is identified, that people within their remit are referred to an occupational health provider and that they attend appointments.
* Ensuring that people within their remit wear or use the personal protective equipment as required for their activities.

**Operators:**

Operators are people who have demonstrated competence to a level where they can work with minimum or no supervision on the specific machinery and plant they have been trained to use. Operators are normally experienced staff, technicians and some postgraduate students. They may be authorised on an “as required” basis to act as a responsible person/monitor to oversee users who are using low to medium powered tools as per the University Workshop Competency Matrix.

Their responsibilities are detailed in the University Health and Safety Policy for staff or students (as applicable).

**Users:**

A user is a person who has had only basic awareness training in the use of specific machines or plant, and is not yet competent enough to be designated an operator. They may only use machinery and plant when a supervisor or designated responsible person/monitor is present. Users are normally students or inexperienced staff.

Their responsibilities are detailed in the University Health and Safety Policy for staff or students (as applicable).

**Visitors:**

A visitor is any person lawfully entering a workplace, who is not authorised to use or operate the machinery or plant within. They must not be put at risk by workplace activities.

If the visitors are contractors who intend to perform work of their own, supervisors must ensure the work activities will not adversely affect the workplace.

**Health, Safety and Wellbeing Service:**

The University’s Health, Safety and Wellbeing Service is responsible for:

* Providing information and specialist advice on machinery and plant management and operation as requested or required.
* Monitoring workplace environments and the health of workers when requested or required.
* Coordinating and conducting investigations of incidents involving serious harm or notifiable events.

**Training**People must not use machinery and plant if they have not received the required training, (in the case of simple low risk plant, this may only require the user to read the instruction manual).

If people are to use or operate machinery and plant within a workshop, they must be trained in the skills, capabilities and competencies to work safely, as per the University Workshop Machinery and Plant Competency Matrix.

Any training received should be recorded on a person’s record of learning or similar database.

Additional training in accordance with industry guidelines or University protocols will often be required to operate specialist or complex machinery and plant such as lasers, drones, and working at height equipment. Operators of vehicles, forklifts, mobile cranes etc. must hold the correct licence or competencies for the machinery and plant that they are operating.

In the case of an experienced operator being recruited to a workplace, they will not require the specified training if they can demonstrate their competency in the machinery and plant they will be operating to the workplace supervisor. A record of this demonstration of competency must be added to their record of learning.

Types of training within a workplace may include:

* Workplace induction: Induction training should match the level of risk within a workplace, and a person’s role. It can take the form of: a simple visitor’s brief that outlines basic safety information; a student induction that sets out workshop rules to multiple users at one time; or a comprehensive workshop induction for an individual operator. An induction can also specify the personal protective equipment that must be used in the workplace. Examples of briefing sheets and induction brief formats can be found on the Staff Intranet: [www.staff.auckland.ac.nz/hsw](http://www.staff.auckland.ac.nz/hsw).
* Workplace safety brief: This training can be used to instruct users of low risk, low-powered machinery and plant on correct set-up and use. Items in this category include, but are not limited to: computers, copiers, projectors, hand tools, small cordless tools, soldering irons, heat guns, palm sanders and 3D printers. It can also specify those items that require a safe work instruction (SWI) to be followed.
* Plant/tool specific instruction: This training is delivered to individuals or small groups of users of moderate risk or medium to high-powered machinery and plant. It should include working through safe work instructions for each item of machinery and plant that will be used or operated, as well as enough practical instruction so that the item can be used safely.

**Basic machinery and plant safety rules**

These are the basic safety rules required by the Machinery and Plant Health and Safety Standard.

1. People within or associated with a workplace must be aware of their roles and responsibilities. *People must be clear on what roles they hold as described above, and of the responsibilities they have as detailed in the University Health and Safety Policy.*
2. People entering a workplace must be inducted to a level that reflects their role, and the level of risk within the workplace.  *As mentioned above, inductions can range from the simple to the complex. In some low risk workplaces, signage alone may be enough to indicate where facilities are. Access to other workplaces such as workshops must be tightly controlled.*
3. People using machinery and plant must be trained to a level that reflects their role and the level of risk associated with the machinery and plant being used. *Low risk machinery and plant often requires only very basic training, if any at all. At the very least, people should follow the manufacturer’s instructions.*
4. People using machinery and plant within a workshop must be trained to a level that reflects their role and the level of risk associated with the machinery and plant being used, as per the University’s Workshop Machinery and Plant Competency Matrix. *Workshops feature a multitude of hazardous machines, and people must know what they can and cannot use. The competency matrix clearly describes the different types of machinery commonly available within a workshop, and classifies them by power level and complexity of use.*
5. People must not use machinery and plant if they have not received the required training. *Colour coding machinery and plant to show their risk level is one easy method to allow supervisors to quickly assess whether someone requires training to use a specific item.*
6. People must not use machinery and plant if they are under the influence of alcohol or recreational drugs. *This includes being under their after affects (such as being hungover). Medical advice on whether machinery and plant can be operated when taking prescription medicines should be sought on a case-by-case basis.*
7. People using machinery and plant must comply with any applicable Safe Work Instruction, and other applicable source of information that is needed to perform work safely. *Other applicable sources of information could be: manufacturer’s instructions, signage displayed near or on the machine, local rules, or University policies and protocols.*
8. People using machinery and plant must wear the personal protective equipment that is specified in any applicable Safe Work Instruction, or other applicable source of information. *The Safe Work Instruction gives you the PPE requirements for that machine, but there may be hazards produced by other machinery or items within the workplace. For example, the SWI may not require safety shoes for a particular machine, but the local workshop rules require them to be worn – in this case, the person operating the machine must wear safety shoes.*
9. People using machinery and plant must comply with any reasonable instruction from the workplace supervisor. *The workshop supervisor is responsible for the safe running of the workplace. They may issue reasonable requests for a person within their remit to do something, or to stop doing something, in the interests of safety. This may extend as far as requesting that someone leave the workplace.*
10. People must not use machinery and plant if they require supervision and a supervisor is not present. *Complex machinery and plant may require a double-check to be carried out before it is started. A supervisor can provide guidance on how to safely conduct an activity, and can manage an emergency if something goes wrong.*

# Safe Equipment

**Get it right from the start**

The easiest way to make sure your machinery and plant is properly guarded and is safe to use is to ensure it comes with the best safety features built in. This may cost more up front than a cheaper item, but a good purchasing decision at this stage will reduce long-term costs incurred by:

* Installing extra guarding.
* Purchasing personal protective equipment.
* Installing extraction systems for fumes or particles.

In the case of more complex equipment, better, more ergonomic controls and passive in-built safety systems will make work easier, reduce the likelihood of injury, and may even prevent accidents from occurring in the first place.

Where items are purchased second-hand, an assessment must be carried out to ensure it meets legislative requirements *before* it is purchased.

Where machinery or plant is manufactured by the University:

* Items must comply with relevant legislative safety requirements (such as electrical regulations).
* Items connecting to utilities such as electricity supplies must use standard connectors.
* Where required, items must be approved by a qualified person (e.g. an electrical service technician, machine guarding validator, engineer, etc.).
* Items must be clearly labelled with the name of manufacturer, date completed, purpose of the device, and where it is to be used.

At a minimum, machinery and plant must comply with applicable Australian/NZ Standards (or other relevant industry safety specifications that meet or exceed those requirements). Past experience has shown that the cost of retro-fitting guarding to an old machine so that it meets the AS/NZ Standard can sometimes cost more than buying a brand new, compliant machine.

Also note that supervisors should be included in any discussion with regards to new machinery or plant. There have been many occasions where a supervisor has requested a specific machine, but someone in the procurement chain has substituted a cheaper item that cannot perform the required tasks or has inadequate safety features.

**Identifying the level of risk within a workplace**

To evaluate a workplace’s level of risk, supervisors must conduct a risk assessment. Further guidance on the risk management process can be found on the Staff Intranet: [www.staff.auckland.ac.nz/hsw](http://www.staff.auckland.ac.nz/hsw)

**Identifying hazardous machinery and plant**

The first step in the risk management process is to identify hazards – a hazard being anything that has the potential to cause harm or damage.

Do a workplace survey to identify all potentially harmful machinery and plant in the workplace. It is important to be realistic about this step, as it is easy to over-estimate the hazard of something that is relatively harmless. Think about the different hazards that may be present, such as mechanical (trapping, impact, projectiles, entanglement, contact, nipping), electrical, noise, vibration, dusts and fumes.

Typical methods used to identify hazards include:

* Physical inspections. Look at the machines and plant within an area and assess where someone could get injured or caught by it. Is it guarded or enclosed, or can you touch moving parts and get hurt? Will exhaust fumes affect other people or get sucked into a nearby air conditioning intake? Will it be really noisy and affect people trying to study in a building next door or damage your hearing?
* Task analysis. What hazards are involved in each task (for example, cleaning or adjusting the machine)? What if you have your arm in a machine to clear out a blockage and someone on the other side of the machine turns it back on?
* Process analysis. What hazards are involved at different steps in a process? What about manual handling if you need to reposition or reconfigure something heavy?
* Guidance and safe work instructions. There is ample information about machine and plant hazards in the guidance material produced by WorkSafe NZ. In addition, SWIs list typical hazards associated with potentially hazardous machinery and plant, and the controls you should consider. Warnings may also be applied to the item itself, such as laser hazard information or an estimated noise level output.
* Accident reports. If something has hurt someone, has it been made safer as a result? What caused the harm? Is there a chance of it happening again?

If you are satisfied that there is no potentially hazardous machinery and plant in your workplace, you do not need to take further steps in the risk management process. Your induction information can be kept to a basic level, and people within the workplace just need to comply with basic user information that may come with the equipment you are using. Their responsibilities for staff/students as per the University Health and Safety Policy still apply.

**Assessing potential risks**If there is potentially hazardous machinery and plant within the workplace, the level of risk it presents must be assessed and scored by the supervisor in accordance with the University’s risk management standards. You can also use an example risk assessment for machinery and plant as a base for your particular needs.

If it is obvious that the risk of a particular machine or item of plant is low, the risk assessment need not be documented.

Any risk assessment should cover the *likelihood* of an incident occurring, and the *consequences* of that incident:

* What are the chances of an incident happening?
* How many people are likely to be harmed, and how serious would any injuries be?

For example, with hazards from moving, rotating or reciprocating machinery, first assess how likely it is that a worker could get caught, entangled or nipped, and then determine how serious any injury might be.

Risk factors to consider during the risk assessment include:

* Visibility – how easy is it to see the hazard? For example, the teeth on a rotating saw blade may be invisible when the saw is at full speed.
* Orientation – for example, a feed screw that is low and horizontal could entangle hair, ties and jewellery. A screw in a different place or angle would pose a different risk.
* Anticipated work practices, including less obvious ones such as:
  + Maintenance, inspection, repair and cleaning practices. Examples: a timber thicknesser’s cutting blade is under a closed panel, but when it jams, a worker may open the panel and stick their hand in; an imaging microscope may contain a powerful laser that can blind a person if a cover is removed while the microscope is turned on.
  + Infrequent or one-off tasks required on the machine.

When assessing the risk, consider:

* How easy is it to reach dangerous machine parts?
* What is the likelihood of a worker putting fingers, hands, arms, feet or legs into places where they should not go when the machine is running?
* Will safety features such as interlocks turn the machine off or apply a brake if an access panel is opened?
* Has the machine or plant been regularly serviced and is it in a good state of repair?

**Risk scores**

The risk scores associated with a machine or item of plant then tell us what level of controls we need:

* Any machinery and plant with an uncontrolled risk level of LOW will normally only require the manufacturer’s instructions to be followed. Check the library of Safe Work Instructions to see if any apply to your workplace. Determine whether any training is needed, and the level of induction that is required.
* Any machinery and plant with an uncontrolled risk level of MODERATE will normally have a Safe Work Instruction. This must be followed along with the manufacturer’s instructions. Determine whether any training is needed, and the level of induction that is required. Other controls must be considered in order to bring the risk down to a lower level.
* Any machinery and plant with an uncontrolled risk level of HIGH or EXTREME must not be used until controls have been implemented to bring the risk down to a lower level. There will normally be a Safe Work Instruction, and training and supervision is also normally required.

**Controlling identified risks**

All machinery and plant risks should be controlled in accordance with the following hierarchy, which is in order of most preferred to least preferred method of control.

You should start from the top and try to *eliminate* the risks associated with an item – you should only work your way through the list if it’s *unreasonable* to use a higher level control.

* Elimination – remove the exposure of the worker to machinery and plant risks by eliminating the need to use it. Purchase pre-cut timber or off-the-shelf parts; contract jobs out to reputable firms with the resources to do a task properly; contact an experienced University technician to fabricate a complex part for an experiment you are working on. *This is the most preferred of all the controls and should be used wherever possible.*
* Minimisation through substitution – replace a high risk machine or item of plant with a safer equivalent. Use a fully enclosed computer-controlled milling machine; replace a blade-type paper guillotine with a roller cutting guillotine; replace a lathe that has poor guarding with a more modern machine that is fitted with chuck guards and emergency stop switches; replace an old forklift with one that is fitted with load sensors and ergonomic controls; replace a noisy machine with a quiet machine.
* Minimisation through isolation/engineering – minimise the risk of harm by isolating a person from a hazard. Examples of isolation/engineering controls include:
  + Placing a hazardous machine in a room or booth that is fitted with interlocked doors.
  + Using light screens/laser sensors to switch off a machine if someone is within the danger zone.
  + Using cages or fences to prevent someone physically reaching dangerous machine parts.
  + Using guards fitted to machines so that people cannot touch moving parts.
  + Using push sticks to push wood past a saw blade.
* Minimisation through administrative controls. Examples include:
  + Clearly describing the process needed to safely undertake a task in a Safe Work Instruction or other similar document.
  + Providing specific training for the task.
  + Supervising an inexperienced user while they operate a machine.
  + Posting signs to restrict access to an area or to warn of hazards.
* Minimisation through personal protective equipment (PPE). This is the least preferred method, as you are not preventing an event – you are just minimising harm or damage. You can reduce the risks of injuries associated with machinery and plant by wearing PPE such as:
  + Safety boots.
  + Safety glasses/face shields.
  + Overalls/dust coats
  + Hearing protectors/ear muffs/ear plugs.

For further advice on control measures, contact the Health, Safety and Wellbeing Service: [hsw@auckland.ac.nz](mailto:hsw@auckland.ac.nz)

**Maintenance and defects**

Machinery and plant must be installed, checked, inspected, cleaned, maintained and adjusted in accordance with the manufacturer’s instructions.

Depending on the complexity of the machinery or plant involved, specialist advice or expertise may have to be brought in to perform those operations. Users in particular must clearly understand what they can or cannot do with regards to maintenance and adjustment, and supervisors must be vigilant in ensuring that personnel do not attempt to do anything they have not been trained to do.

When guards or other protective devices must be removed or otherwise defeated during maintenance, power sources should be removed, isolated, and locked out so that a machine is not able to be started using the power buttons or other controls.

Defective machinery and plant is to be taken out of service as soon as defects are identified. Repairs must be carried out by a competent person.

**Disposal**

Machinery and items of plant that are to be sold or gifted to a third party must meet the following requirements:

* Supervisors must ensure the equipment is in a safe working condition and make a written declaration confirming this for University records. (Declarations may be in the form of an email).
* Where defects cannot be resolved, a written declaration that details the defects must be made.

If the machine is being decommissioned because it is unsafe, it must be destroyed or scrapped in accordance with the University Waste and Sustainability Policy. The item should be cleaned, contaminants be removed, and be disposed of in a responsible manner.

Note: where such items are offered for scrap to a third party, a declaration shall state that the machinery or item of plant is only to be used for scrap.

# Workplaces

# Access As can be seen above, University workplaces differ significantly in the level of risk that they present to staff, students, and others. Supervisors should consider the levels of risk, and the access controls that are realistically required. Some examples are:

# Low risk: Classrooms and lecture theatres: Here we can expect people with a low level of knowledge with respect to machinery and plant to be in an area while they are unsupervised. Everything within this area should be safe or low risk. No access controls are required. Students should be given basic information on emergency muster areas, and signage can indicate fire exits, toilets, etc.

# Low risk, but some controls are required: Shops, cafes, theatres and office spaces. Here the workplace is often divided into public and restricted areas. There should be nothing that can harm people in the public spaces, but where there is a risk to security, or if there is plant such as stoves, ovens and coffee machines, access can be restricted to staff and other operators. Access controls may be as simple as having a bench separating the public areas and working area. Workers should have had a basic induction brief.

# Moderate risk: General laboratories, areas where moderate risk experiments are being conducted and workshops where low-powered machinery is being used. Only people associated with these workplaces should normally be within these areas, with the public or other people being denied access. Access can be controlled via swipe cards or combination locks. The people working in these areas need to have an induction brief, and visitors and contractors also need to be briefed about specific workshop hazards before they can enter. People using machinery and plant must be made aware of Safe Work Instructions. Some PPE may be required.

# Potentially high risk indoor areas: These include workshops where high- powered machinery and plant are being used, containment laboratories, hazardous goods stores, laser laboratories and building/infrastructure plant rooms. Only people associated with these workplaces should be within these areas, with the public or other people being denied access. Access can be controlled via swipe cards or locks. The people working in these areas need to have a comprehensive induction brief, and visitors and contractors also need to be briefed about specific hazards before they can enter with an escort. People using machinery and plant must have been made aware of Safe Work Instructions, safe methods of use, and any other protocols that apply to the workplace. PPE is normally required.

Outdoor areas during high risk operations (such as tree felling, excavations, construction, or where large lawn mowers or other heavy plant is being used): Only people associated with these workplaces should be within these areas, with the public or other people being denied access. Access can be controlled via fences, barricades, cones and signs. The people working in these areas need to have a comprehensive induction brief, and visitors and contractors also need to be briefed about specific hazards before they can enter with an escort. People using machinery and plant must be made aware of Safe Work Instructions, safe methods of use, and any other protocols that apply to the workplace. All workplace occupants must be constantly looking for intruders or unauthorised people encroaching on the work area, and work must be halted if a person is within the danger zone. PPE is normally required.

# Planning for workplace hazard management Supervisors and managers must consider others when planning for work within a workplace. Given that the University is constantly upgrading facilities, work groups are often moved to a temporary facility while the new workplaces are being built. Planners should take the following into account at the design stage:

* What other people/work areas are nearby or adjacent to the new workplace? Do they require peace and quiet for studies or sensitive experiments?
* Will the new workplace introduce new hazards such as increased fire risks, hazardous substances, restricted pedestrian movement, noise or vibration?
* Can machinery and plant be easily installed or removed from the workplace?
* Does the layout of the workplace allow for safe access, including when moving past machines that are being used, and when delivering materials?
* Is the lighting and ventilation sufficient for the work being done?
* How will noise and fumes be safely managed?

Supervisors should ensure that operations within the workplace do not affect others or the environment. If it is likely that operations will disturb people working or studying in nearby areas, consideration should be given to conducting the work out of normal working hours or during the weekend.

**Working environments**

As far as is reasonably practicable, workplaces must provide a good work environment, and many aspects of providing for this should be addressed during the design stage or when planning for work. Things that should be considered are:

Safe layout: Is there sufficient space around each workspace, or are people, machines and plant crammed into an area that is too small? Workshops require safe means of access to other parts of the workshop, and machines should not be placed where people entering the workplace will be put in danger.

Lighting: Industry guidance provides comprehensive advice on the appropriate light levels for differing types of work. However, a subjective assessment is normally sufficient. Detailed, fine work that requires someone to accurately read measuring instruments requires more light than work such replacing an air conditioning filter. Glare and direct light should be avoided, especially when using computers. Colours and hues need to meet the task as well, especially where items are colour-coded for safety purposes.

Ventilation: A lack of ventilation will lead to workers feeling uncomfortable and lethargic. Overloaded or under-maintained air conditioning systems can also lead to the development of respiratory diseases. If hazardous substances are in use, there may be a legal requirement to ensure a number of air exchanges per hour or to use fume cupboards. Dusts and fumes from operations such as welding should be removed at source, not left to drift around the workplace.

Noise: Noise should be reduced at source by using quiet machines and plant. Isolation can be achieved by placing noisy machines in sound-proof booths or rooms. PPE such as ear plugs should only be used if other noise reduction methods are not effective. Legally, a person can be exposed to noise levels of 85dB(A) up to 8 hours a day, though most people find lesser noise levels to be very uncomfortable or even painful. Contact the HSW Service to conduct noise measurement if you feel that noise in your workplace is too loud.

Temperature: Temperature should be reasonably comfortable, though levels of comfort can differ from person to person. Work areas where workers must wear a lot of protective equipment and clothing should be at a lower temperature than an office where light clothing is worn.

Washing facilities, food and water: Sufficient washing facilities should be provided to cater for the type of work being carried out. Workplaces where heavy, dirty work is being carried out should have provision for showering. Clean drinking water should be provided, along with clean areas where food can be eaten without being contaminated by work processes. Perishable food in refrigerators should be disposed of before it rots or grows mould.

Housekeeping: Good housekeeping reduces trip and dust hazards, and minimises the risk of food-borne disease. Though some mess may be unavoidable, the area should be tidied at reasonable intervals (and no later than at the end of the working day). Supervisors should monitor each working area as they see fit.

Monitoring: Where workplace environments cannot reasonably control hazards such as dusts, fumes and noise, workers should be monitored to ensure their health is not affected by work activities. This monitoring can take the form of hearing tests, lung function tests and examinations appropriate to the hazards that are present. The results of the monitoring should be made available to the worker. The workplace itself can also be monitored upon the request of the workplace supervisor, and the HSW Service can check noise levels, light levels and airborne contaminants.

**Compliance Information**

Supervisors should be aware of other University standards and protocols that may affect their workplace. These have been developed by the HSW Service, using information from authoritative sources on what must be done to comply with legislation. These normally take precedence over the information published by WorkSafe NZ and other similar sources. Examples of such University standards and protocols that may affect a workplace are:

* Safe methods of use.
* Lone work.
* Work out of normal working hours.
* Electrical appliance testing.
* Laser use.
* Working at height.

If there is no applicable University standard or protocol, external sources of information should be used. These can be divided into regulatory documents that we must comply with, and good practice guidance, which gives information on how to do a task safely. Examples are:

* Compliance documents: Health and Safety at Work Act, Approved Codes of Practice, Australian/New Zealand Standards
* Good practice guidance: WorkSafe NZ and ACC Guidelines and information sheets, guidance released by industry (such as the Metal Trades) Guidance at the following website includes: computer use, workplace bullying, fatigue, stress, safe use of machinery, welding and many other subjects. <http://www.business.govt.nz/worksafe/information-guidance>
* User manuals and manufacturer’s instructions should also be followed as much as possible, and should be readily available.

The HSW Service should be contacted where there is any doubt over what documents take precedence.

Workplaces also need to display signage appropriate to the site. Even low risk workplaces should display signs that indicate toilets, fire escapes and first aid facilities. Workshops should display signs notifying of PPE requirements, and safe work instructions should be laminated and displayed near the items they refer to. Sites where hazardous operations are being carried out may need extra warning signs that describe the hazards involved.

**Compliance recording**

Supervisors should make sure that the following records are maintained, and kept readily available within the workplace:

* Where machinery and plant within a workplace require recorded scheduled servicing, maintenance activities must be recorded. *These records can take the form of log books, equipment registers or electronic databases. If any repairs or modifications that may impact the operational safety of machinery or plant have been carried out, records of the repair or modification must be retained for the life of the item.*
* Where training to operate machinery and plant is required, workplaces must maintain a record of training. *These records may be paper-based or electronic databases.*
* Workplaces must have emergency response plans in place to deal with emergencies that are likely to occur. *All workplaces need evacuation plans in case of fire, along with basic emergency plans to deal with medical emergencies, accidents, earthquakes, power failures and violent attackers. Workplaces may need specialised emergency plans to cater for hazardous material spills, gas leaks or biological releases. Hard copies of Hazardous Substance Safety Data Sheets should be readily available, as they describe first aid actions and spill response procedures. Workshops will need emergency stop switches to be mounted on larger machines, and master stop switches to be installed at strategic positions throughout the workshop. Further information on emergency management can be found on the Staff Intranet:* [www.staff.auckland.ac.nz/hsw](http://www.staff.auckland.ac.nz/hsw).
* Workplaces must record and report incidents (including accidents or near-misses) as per University of Auckland policy. *This is to ensure that any learning from such an incident is captured so that it is not repeated. Incidents that cause serious harm or are notifiable events must be reported to the HSW Service without delay, and the accident scene must be preserved as much as possible for an investigation.*

# DEFINITIONS

The following definitions apply to this document:

**Control** is an item or action designed to remove a hazard or reduce the risk from it.

**Hazard** refers to anything that has the potential to cause harm (injury or ill-health) or damage to property or equipment in connection with a work activity.

**Incident** is any unplanned event resulting in, or having a potential for injury, ill health, damage or other loss.

**Machinery** is a collective term for machines and their parts. A machine is considered to be any powered apparatus that has interrelated parts and is used to perform work.

**Personal Protective Equipment (PPE)** refers to anything used or worn by a person to minimise risk to the person’s health or safety. PPE includes a wide range of clothing and safety equipment, such as: overalls, boots, face masks, hard hats, ear plugs, respirators, gloves, safety harnesses and high visibility clothing.

**Plant** is a general name for machinery, equipment, appliances, implements or tools and any component or fitting or accessory of these. It can include things as diverse as presses in a foundry, excavators and trucks in mining, and photocopiers in an office. It can range from electric drills, lifts, escalators, tractors, hand trolleys, cranes and other lifting gear to arc welding gear.

**Risk** refers to the likelihood a hazard will cause harm (injury or ill health) and the degree of harm (consequence). Residual risk is the risk that remains after controls have been applied to a hazard.

**Risk assessment** is the process of evaluating the risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether or not the risk(s) is acceptable.

**Role** is an indication of a person’s competency when interacting with machinery and plant. Typical roles within a workplace are: supervisor, operator, and user.

**Safe Methods of Use** are University developed protocols that detail safe work methods for laboratories and high risk substances, such as: chemicals, compounds, cryogenic fluids, mercury etc.

**Safe Work Instruction(s)** are written instructions to inform users of potentially harmful equipment about mandatory PPE, associated potential risks, prohibited actions, and actions that must be taken before use, during use and after use of the equipment.

**University** means the University of Auckland and includes all subsidiaries.

**Visitor** refers to any person lawfully entering a workplace, who is not authorised to use or operate the machinery or plant within.

**Workplace** is any physical location in which work-related activities are performed under the control of the University.

**Workshop** is any workplace specifically set up to manufacture, repair or service items with the use of machinery or plant.

**KEY RELEVANT DOCUMENTS**

Include the following:

* Health and Safety at Work Act 2015
* University of Auckland Health and Safety Policy
* Machinery and Plant Health and Safety Standard
* Machinery and Plant Procedures
* WorkSafe NZ Best Practice Guidance for the Safe Use of Machinery
* Workshop Machinery and Plant Competency Matrix
* Safe Work Instruction template

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