

PLANT – Life Cycle Stages

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The University and its budget areas have specific duties according to its role in the life cycle stages of plant. All aspects of the plant's life cycle should be considered including:

Part A Plant that the ANU designs, constructs or manufactures

Part B Acquisition / Purchase of Plant and Equipment

Part C Installation and Commissioning

Part D Operation / Use

Part E Maintenance and Cleaning

Part F Decommissioning, Storage, Dismantling and Disposal

Part A Plant that the ANU designs, constructs or manufactures

A Budget Area within the University may design, construct and/or manufacture plant in undertaking its activities for the University. In doing so, the University is taking on duties of a designer and/or manufacturer under the Regulations. The Budget Area should meet all responsibilities under the Regulations and ANU Procedures.

If a Budget Area manufactures or supplies plant that will be used by staff members, students or general public, the Budget Area will take all reasonably practicable steps to -

- a) Design and construct plant to be safe and without risk to health, with due consideration to the lifecycle of the plant: design, manufacture, erection, installation, commissioning, inspection, cleaning, maintenance, decommissioning and disposal;
- b) Research, test or examine the plant to identify any hazards, and if present, eliminate the hazard or minimise the risk to health and safety. Expert advice may be required;
- c) Ensure the receiver of plant designed and/or manufactured by the University has the same information that they would expect to receive when dealing with a reputable company or organisation. The documentation should include a risk assessment (see Plant Dossier and Plant Risk Assessment and Management Summary templates) and indicate: -
 - The use or purpose for which the plant has been designed;
 - Tests conducted on the plant;
 - Details of the design and construction;
 - Conditions necessary to ensure, when used as designed, it will be safe and without risk to health;
 - Commissioning of plant e.g. transportation, installation, operation, cleaning and storage of, and where and how to dismantle the plant;
 - Any risks to health and safety if the plant is not used properly;
 - Systems of work necessary for the safe use of the plant;
 - Any relevant knowledge, training or skills necessary for persons operating, inspecting and testing the plant;
 - Service, testing and/or inspections that are required to be undertaken on the plant;
 - Relevant emergency procedures.

Duties as a manufacturer - As a manufacturer of plant, the Budget Area assumes the role and subsequent responsibilities of the designer. The manufacturer shall ensure that the assessment processes in the design of plant is compliant with the Standard or code relevant to the type of plant being manufactured.

Hazard Management

If an unforeseen hazard arises during the manufacturing process of plant, the hazard should be

eliminated or effective measures taken to minimise the risks posed by the hazard. The designer may be required to revise the original design to control the risk where practicable. Any hazards or faults found with the design, however small, shall be inspected and tested in accordance with the relevant Standard, with the designer of the plant consulted in regard to the hazards or faults found.

In cases where significant hazards or faults arise affecting previously manufactured plant (already in the workplace), the manufacture/design must advise the user of the hazards or faults and subsequent risk control to be undertaken.

Alterations and Modifications

Where plant has been altered or modified, the Budget Area must ensure that the design of the alteration is assessed for risk. When the plant has been significantly altered, it shall be inspected and tested by a competent person in regard to the design specifications for the alteration. A record of inspection and testing shall be kept and where required the appropriate authorities must be informed. This shall be undertaken prior to the plant being returned to service (commissioning).

Licensing and Registration of Plant

It is the responsibility of the Budget area to arrange licensing and design registration and certificates of conformance prior to commissioning for certain items of plant. Advice can be sought from the OHS Branch. An item of plant may also need to be registered with Comcare by the Budget Unit.

Part B Acquisition / Purchase of Plant and Equipment

Pre-purchase risk assessment

A risk assessment should be conducted prior to purchasing to ensure informed purchasing decisions that minimise OHS risks prior to the introduction of plant in the workplace. A documented risk assessment process is required to comply with the regulations.

To simplify the process, items of plant should first be assessed for their hazard level. The hazard level indicates the extent of the required assessment of risk for the use of plant in its environment. This assessment determines the overall risk category of the plant. Also consider existing risk assessments from similar plant.

Risk management activity will then depend on a category of risk for the plant. This process can be found in the ANU's Plant and Equipment Risk Evaluation Guide, including the following forms:

- **Plant Pre-Purchase risk assessment checklist (supplied)**
- **Plant Risk Assessment and Management Summary (PRAMS) Form (supplied)**

The plant pre-purchase assessment checklist identifies acquisition and purchase requirements and potential problems of an item of plant. This information potentially reduces inappropriate commitment of University finances and/or exposure of staff and others to unacceptable risks due to unsuitable plant. Reputable suppliers, manufacturers and retailers of plant may assist in completing the checklist and may provide a demonstration or trial of plant to ascertain the suitability to workplace requirements.

Consider the following when making a pre-purchase decision:

- Whether a task or operation is required (possibly eliminating the need for plant to be introduced to the workplace);
- Whether the task can be undertaken in a different way (possible substitution of less hazardous plant);
- Task requirements - define what the expected task / operation / process is required to be, and how the plant or equipment will assist in this (e.g. develop a business case);
- Any environmental or work practice issues (e.g. wet areas, flammable gases, work at heights);
- Equipment specifications - identify appropriate plant available on the market that has those attributes / specifications;
- If there is no suitable equipment on the market, can the plant/equipment be manufactured? If so, see the section on manufacturing.

Duties as a Supplier– The University should ensure that a supplier who imports plant complies with the duties of an importer. A person supplying by hiring, or leasing plant to a workplace is also deemed a supplier under the Regulations and must ensure that:

- Plant that is hired or leased shall be inspected between hiring's and leasing, to minimise the risks to health and safety;
- Faults known with plant shall be reported prior to supply to the purchaser or owner where plant is not in the control of the supplier.

Choosing a supplier

Suppliers should be able to provide:

- Choice and availability of products;
- Compliance with health and safety requirements;
- Plant demonstration arranged for a Budget Area;
 - Service and warranty agreements;
 - Training and technical support;
 - Maintenance schedules of the plant;
 - Availability of serviceable components;
 - The location of service outlets;
 - Product information; and
 - Have a process for recall or defect notices.

Duties as an Importer – Note that the University holds obligations as an 'importer' if the designer/ manufacturer of the plant is located overseas. To avoid this situation, it is preferable that the University purchases plant from Australian based sources or those with local agents, where possible.

An importer must ensure that plant used in an ANU workplace is assessed for hazards to health and safety. These hazards should be eliminated or the risks controlled as far as is reasonably practicable. An importer is responsible to provide information about the particular plant. This information should allow the user to determine compliance to relevant legislation or standards to achieve safe use of the plant in the workplace.

Plant for scrap or spare parts

Where the supply/ importation of plant is for the purpose of scrap or spare parts, documentation and marking of the plant is required prior to the plant being supplied. This is to ensure that the University does not place the plant or equipment into service.

Part C Installation and Commissioning

Installation

University staff or contractors responsible for the installation or erection of plant in a workplace must take all reasonably practicable steps to ensure that hazards identified with plant have their associated risks effectively controlled. This must occur before the plant is commissioned for use.

The installer, erector and other people engaged in the installation process must follow designer/ manufacturer instructions or the advice of a competent person. Approved persons can perform installation of plant with consideration to the following:

- Eliminate hazards or minimise risks due to the installation and erection of plant;
- Locate the plant with sufficient clearance to enable operation, servicing, maintenance, cleaning and repairs of the plant;
- Protect the plant from the elements if required;
- Allow sufficient circulation for cooling and the added heat load the plant may present to an area;
- The impact of, or on, adjacent equipment or services (especially where water or flammable materials are concerned);
- Proximity to overhead electrical power lines (refer to the requirements of the electrical supply authority), or underground services. Note: If excavations are necessary, a permit must be obtained per the ANU Operational Procedure for Front-End Loader (in development – contact the OHS Branch).

A competent person must conduct checks on the plant prior to use, including whether a permit, licence and/or registration is required; and a report is provided confirming that the plant has been installed correctly.

Plant purchased directly from overseas must be assessed for suitability for use in Australia. Attention to

the operating voltage and frequency ranges is essential (particularly in the case of three-phase equipment, whether the rated voltages refer to phase to phase or phase to neutral connection - if the frequency is incorrect, some devices within plant may overheat, lose time or otherwise fail).

Commissioning

Prior to commissioning, plant must be checked, tested, and appropriately inspected to minimise risk to health and safety, in accordance with manufacturer and designer recommendations; or as developed for the plant by a competent person.

Plant should not be placed into operation until the commissioning and testing process is complete to ensure that the plant is:

- Appropriate for the task;
- Installed or erected suitably to enable work to be undertaken.

Essential precautions required during the testing and initial start-up to ensure safeguards are maintained include:

- All electrical wiring meets the requirements of AS/NZS 3000 (SAA wiring rules). For plant with an electrical power supply, the Budget Area is responsible for the electrical aspects and must also comply with the [ANU Electrical Safety Procedure](#);
- Backup power, fire fighting and other emergency response equipment are in place during the initial commissioning; and
- Interconnecting utilities and services are checked for satisfactory operation and integration.

The Budget Area must ensure that:

- Written operational procedures are available for start-up and shutdown operations;
- All relevant personnel receive appropriate training and instruction on any residual risks, operational, maintenance, and emergency procedures relating to first use and aspects directly affecting the relevant tasks.

Where re-installation of plant is being re-commissioned as a result of modifications, the Budget Area must ensure that appropriate risk management is conducted.

Existing Plant and Equipment

A risk management process should be undertaken on existing items of plant to achieve safety, compliance and best use of University resources. The evaluation is best incorporated into the operating procedures and/or associated guidance material for the plant.

Part D Operation / Use

Operating Procedures

Operating procedures are required for each hazardous duty involving the use of plant required of a staff member, student or contractor.

The **Plant Risk and Management Summary (PRAMS)** form is to be included in the standard operating procedures to support documentation of the risk management process.

Safe working procedures shall be documented by competent members of staff, in conjunction with the manufacture's instruction manual/s. Additional resources are available in:

- Risk Management Protocol of the Workshops – ANU Workshop Safety Manual (OHS)
- Standard Safe Operating Procedure of the Workshop Safety Procedures (e.g. Operational Procedure-Front-end Loader).

The Budget Area (Department) must ensure that:

- The risks, which may arise from the use of plant, and associated systems of work, are minimised to an acceptable level;
- Methods to prevent the unauthorised use of plant are implemented to minimise the risk to health and safety;
- Persons in the workplace are prevented from coming into contact with plant with moving parts through appropriate risk control (e.g. isolation and guarding).
- Any personal protective equipment required shall be incorporated within the standard operational procedures for that plant.
- Maintenance and cleaning procedures of plant are carried out in compliance with the procedure.

Duties of an Operator - staff, students and visitors are not to use any plant unless necessary instruction, training, and supervision is provided to minimise risks to health and safety during its operation.

Staff, students and visitors must take all reasonably practicable steps to ensure they:

- Comply with all requirements relating to plant that they are operating and any related University procedure;
- Use the plant only for the purpose for which it is designed, or where a competent person determines its purpose is safe to do so;
- Have appropriate and current licence or competency to operate plant (where required);
- Use as intended all appropriate safety features and warning devices;
- Use any required personal protective equipment (eg safety glasses, footwear etc);
- Notify their immediate supervisor verbally of any defect or other hazard on the plant being operated, and lodge a hazard report. The supervisor must act to eliminate the hazard or control the risk, as reasonably practicable. The plant should be isolated or 'danger tagged' until repaired;
- Report in a timely manner any death, injury, exposure or dangerous occurrence for staff, students or any person undertaking an activity at the University, using the online incident notification system.

Training, Supervision, Information and Instruction

Before a person operates plant with significant risk, the Budget Area must provide the necessary information, training and instruction to operate the equipment in a safe manner and without risk to health. The Budget Area must ensure that the supervisor and persons who operate plant are appropriately trained in relation to:

The hazards identified to determine the plant medium or high risk;

- Safety procedures associated with the medium and high-risk plant;
- Instruction on the proper use and maintenance of control measures;
- Personal protective equipment use, fitting, testing and storage requirements;
- The use and availability of information specific to the medium and high-risk plant.

Information is to be provided to a person involved in:

- The erection, commissioning and installation of plant; or
- The operational use of the plant; or
- Testing and inspections required; or
- Decommissioning or disposal of plant;

Where relevant, warnings and emergency procedures are to be displayed so to be visible to a person who is, or is likely to be affected by, the operation of the particular plant.

Access and Egress

To operate plant safely, the area around plant shall be kept clear and clean of debris and clutter.

The Budget Area must take all reasonably practicable steps to ensure that a person responsible for the control relating to access and egress confirms that there is sufficient access and egress to:

- The workstation of the operator and plant;
- To parts on the plant for cleaning and maintenance purposes; and
- Any person that may become trapped and/or exposed to risks caused by heat cold or lack of oxygen.

The Budget Area ensures that, where reasonable or indicated through risk assessment, provision is made for safety doors, emergency lighting and alarm systems for use with particular types of plant e.g. for liquid nitrogen rooms, CO₂ cabinets, and other hazardous locations.

Isolation Practice and Danger Tagging Procedure

Where plant is isolated but not disconnected from the supply, all possible precautions must be employed to prevent inadvertent energising. These hazards can be reduced by indicating that the plant is:

- Faulty and not to be operated;
- Currently under repair or being serviced;
- Isolated from the electrical power supply;
- Locked by brake or locking mechanism to prevent movement; and/or
- Other types and variations of signage, lockouts and mechanical interlocking devices may also be utilised.

Refer to the Isolation and danger tagging procedure.

Dangerous Parts

The Budget Area must take all reasonably practicable steps to ensure that a person responsible for assessing risks relating to dangerous parts on plant (during operation, examination, lubrication, maintenance, and adjustment) eliminates the hazard/s or if it is not reasonably practicable to eliminate, then applies appropriate controls to further minimise the risks. This may include:

- Guarding of hazardous areas/parts,
- Appropriate operations switches and controls, and/or
- Emergency stops and warning devices.

Part E Maintenance and Cleaning

The Budget Area is responsible to maintain plant in their areas in a safe working condition. Maintenance of plant includes statutory maintenance (required by outside authorities), preventative maintenance (recommended by manufacturers) and corrective maintenance (repair). Maintenance documentation for registered plant is required (see Facilities & Services *maintenance guidelines*). The *Maximo* system is a useful tool to document safe job plans and maintenance information.

Budget areas that utilise ANU maintenance staff or contractors must ensure that a safe system of work can be implemented to minimise risks associated with the work requests. The work process shall be effectively supervised.

Damage Assessment and Repair of Plant

The Budget Area must take all reasonably practicable steps to ensure that a competent person shall assess the damage or impairment of the plant, to advise on:

- The extent of the damage; and
- If the plant is suitable to be repaired; and
- Where the plant is repairable, the scope, details and type of repairs, with the aim of minimising the risk to health and safety of persons in the workplace.

Repairs on plant shall be undertaken by a competent person, who has the necessary trades experience, knowledge and skills for the repair. All repairs and/or maintenance on plant shall be recorded (on the *Maximo* system).

Repairs shall be carried out in a manner that does not alter the original design of the plant (see section Alterations and Modifications in Part A).

Cleaning of Plant

The plant must be cleaned at intervals prescribed by manufacturer specifications or as established by a competent person with experience and knowledge of the specific plant (or as documented in local procedures).

The Budget Area must ensure that during the cleaning of high hazard items of plant that danger tagging and isolation practice procedures are applied.

Part F Decommissioning, Storage, Dismantling and Disposal

Disposal of radiation apparatus (eg. laser and x-ray equipment) requires specific approval by the regulator (ARPANSA). Contact OHS Branch for guidance.

If plant is dismantled, decommissioned or otherwise sold for disposal, the Budget Area must ensure all relevant information provided by the designer and manufacturer is passed onto the competent person to dismantle or take control.

When storing plant in the workplace, the Budget Area must ensure that a competent person stores the plant in a manner that poses no risk to the health or safety of any person in the workplace.

Documentation

Risk assessment documentation should be kept for 7 years after the disposal of the plant. Other relevant documentation may be transferred or disposed of with the plant.

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