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Contact Officer	Manager, UNSW Health & Safety		
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1. Introduction and Scope

The purpose of the HS Design and Modification Guidelines is to ensure a process of identifying potential hazards in the design and modification phases and eliminating the risk or ensuring control measures are appropriately implemented to prevent injury or illness. This is applicable for any equipment, experiments or construction projects where the absence of such control measures will have an adverse impact on health and safety.

UNSW personnel involved with the design or modification of equipment, processes or facilities are responsible for ensuring that HS requirements are incorporated in the design or modification processes to ensure compliance with legislative requirements and HS specifications.

Qualifications, experience and skill requirements for design personnel are to meet any legislative, code of practice or national standard requirements. Design personnel should be selected based on competencies as defined under these requirements – this may include external or internal roles within the University. Design personnel may include individuals or a team.

2. Definitions

See Appendix B

3. Guidelines

3.1 Legislative Requirements

The WHS Act 2011 sets out the duties of a person conducting businesses or undertaking that design plant, substances or structures. A designer must ensure, so far as is reasonably practicable, that the plant is designed without risk to the health and safety of persons who use, store or are in the vicinity of the plant at a workplace. To achieve this, a designer of plant must ensure that all hazards associated with the use of machinery/equipment are identified and controls integrated within the design where practicable, having regard to the state of knowledge of the hazards.

Any plant, equipment or facility designed by or on behalf of UNSW shall meet legislative requirements and give due consideration to national standards and Codes of Practice where applicable.

Legislative or additional requirements pertaining to HS requirements must be identified in writing with the project plan, risk assessment or purchasing specification documentation.

3.2 Design of Teaching or Research Equipment

The process for risk management for the design, installation, commissioning, operation and maintenance of new and modified machinery and equipment is described in the flow chart provided in Appendix D of this document.

Staff or students responsible for designing or modifying equipment or processes for teaching or research purposes must complete a risk management plan including assessment of the risks prior to development. The risk management plan must be approved/certified by a competent person to ensure that all risks from identified hazards are controlled to prevent injury or illness prior to development.

A designer of plant and equipment must assess the risks associated with identified hazards in accordance with the UNSW Risk Management Procedure. The following should be taken into account when assessing risk:

- any risk factors associated with the use of the plant and equipment; and, so far as is practicable;
 - any statutory requirements for design and/or registration with regulatory authorities;
 - risk factors associated with the use of the plant and equipment which are specific to the workplace in which it is to be used;
 - the range of environmental and operational conditions in which the plant and equipment is intended to be used;
 - the types of person who will eventually use the plant unsupervised and;
 - any ergonomic considerations in relation to people who may use the plant and equipment.

Design and modification considerations to be addressed in the risk management plan include:

- Construction methods – including processes and materials;
- Use and maintenance – especially risk arising out of the nature of the design itself;
- Removal, demolition or decommissioning activities.

The risk management plan must include consultation with key stakeholders.

A designer of plant and equipment must ensure that any hazards associated with the use of the plant and equipment are controlled in accordance with the hierarchy or risk control. Where residual risks exist, controls such as emergency stop devices, warning devices and other emergency controls are incorporated and are easy to access from the point of operation / use.

Where identified in the risk assessment process, design personnel shall be required to provide advice, certification, registration or implement legislative requirements or risk control measures. For example, a licensed electrician is required to determine and certify designed or modified plant or equipment which uses electricity. HS requirements must be documented in writing in the form of a risk assessment, purchasing specification or project plan.

Approval for the development/design of research design equipment is determined by the academic supervisor. Additionally where design impacts upon facilities, consultation is required with Facilities Management.

Verification of HS design requirements must be conducted by the appropriate design personnel consulted in the initial stage of development.

A designer of plant and equipment must ensure that the following documentation is developed and handed over with the machinery/equipment:

- completed risk management documentation;
- record of standards, engineering principles and calculations used;
- operation manual;
- servicing information and requirements;
- schematics/plant diagrams; and
- safe work instructions or training documents.

3.3 Design of Facilities

Where Facilities or buildings are to be designed or redesigned then this is covered by Facilities Management (FM) processes. Contact FM for further information.

Where UNSW Canberra facilities and building are designed or redesigned, Department of Defence guidelines apply.

3.4 Consultation on design changes

Where plant design, operation or workspace layout changes have occurred, this must be communicated to all relevant stakeholders. This may be done through avenues such as the local Lv3 committee, team or face-to-face meetings.

3.5 Registration of Plant Design and Items of Plant

The designer (if UNSW personnel) or person with designated responsibility for the plant design is responsible for registering the plant design if the plant being designed is one listed in Appendix C – registrable plant by applying to the Regulator to register the plant design.

The person with designated responsibility for the plant is responsible for ensuring that an item of plant is registered if it is listed in Appendix C – registrable plant by applying to the Regulator to register that item of plant.

Registrable plant that has not been registered must not be used in the workplace.

If the plant is altered, the altered design must be reregistered with SafeWork unless it has been registered with another WHS regulator.

See the [SafeWork](#) (NSW) or [WorkSafe](#) (ACT) website to register your design.

3.6 Design Control Records

If the design of plant is required to be registered, the designer of the plant must record any published technical standard, including any part of a published technical standard that was used to design the plant. If technical standards have not been used then the engineering principles used to design the plant must be recorded.

A list of examples of technical standards is available in Appendix C of the Code of Practice for managing the risks of plant in the workplace.

For plant that requires design or item registration then records relating to all tests, inspections, maintenance, commissioning, decommissioning, dismantling and alterations must be kept for the period the plant is used or until control of the plant is relinquished.

4. References

[Model Code of Practice - Managing the Risks of Plant in the Workplace](#) – Safe Work Australia
[National standard for Plant \[NOHSC:1010 \(1994\)\]](#) – Safe Work Australia

5. Acknowledgements

University of Wollongong

6. Review and History

Appendix A: History

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director, Human resources	01/10/2010	01/10/2010	New Document
2.0	Director, Human resources	29/04/2013	29/04/2013	Complete rewrite and renaming of the Plant design guideline. Updated Branding Logo in accordance with UNSW Branding Guidelines. Modified the document identifier from OHS to HS in accordance with WHS legislation review
2.1	Director, UNSW Safety and Sustainability	30 April 2014	30 April 2014	Reviewed for administrative updates
2.2	Director, UNSW Safety and Sustainability	3 March 2016	3 March 2016	Reviewed for administrative updates

Appendix B Definitions

Alter: in relation to any plant means to change the design of, add to or take away from the plant where the change may affect health or safety, but does not include routine maintenance, repairs or replacements.

Commissioning: means performing the necessary adjustments, tests and inspections to ensure plant is in full working order to specified requirements before the plant is used. Commissioning includes re-commissioning.

Competent person: means a person who has acquired through training, qualification, or experience, or a combination of these, the knowledge and skills enabling that person to perform the task required.

Designer: means a person who designs or modifies plant for use in a workplace or plant intended to be used in a workplace or is responsible for the design. In the University environment, this includes any experimental device/piece of equipment fabricated for experimental, research or teaching use.

Electrical installation: means all the electrical wiring, accessories, fittings, consuming devices, control and protective gear and other equipment associated with the installation situated in or on workplaces.

Electrical plant: means plant which consumes converts or generates electricity.

Erector means a person who erects, dismantles or alters the structure of plant in a workplace.

Ergonomic: means to optimise the functioning of the plant and systems of work associated with the plant by adapting them to human capacity or need.

Fault: means a break or defect which may cause the plant to present an increased risk to health and safety. In the case of a fault in the design, this means an aspect of the plant design which may cause the plant to be a risk to health and safety if manufactured in accordance with the design specifications.

Gas cylinder: means a particular rigid pressure vessel not exceeding 3000 litres water capacity and without openings or integral attachments on the shell other than at the ends, designed for the storage and transport of gas under pressure and which is covered by AS 2030.

Guard: means a device that prevents or reduces access to a danger point or area.

Hazard: means the potential to cause injury or illness.

Importer: means a person who imports plant for use in a workplace or plant intended to be used in a workplace.

Installer: means a person who installs plant in a workplace.

Interlocked: means the connection between a guard or machine element with the control system or the power system of the plant. This connection allows access to the moving parts of the plant at the times when those parts are not moving and prevents moving parts from starting up or operating when access is available to those moving parts.

Manufacturer: means a person who manufactures plant for use in a workplace or plant intended to be used in a workplace.

Minimise: means to reduce to the lowest practicable level.

Plant: includes any machinery, equipment (including scaffolding), appliance, implement or tool and any component or fitting thereof or accessory thereto. Experimental and research apparatus designed, manufactured and supplied to staff and students, by staff and students or a third party, is also plant and equipment.

Pressure equipment: means boilers, pressure vessels and pressure piping. For the purposes of this national standard pressure equipment are those specifically covered by AS 1200 and having hazard level A, B, C or D according to the criteria identified in AS 3920 Part 1, Pressure Equipment Manufacture - Assurance of Product Quality.

Repair: means to restore plant to an operating condition, but does not include routine maintenance, replacement or alteration.

Risk: A risk is the chance of something happening that will have an impact on objectives. It is measured in terms of consequences and likelihood. In the OHS context, risk should be thought of as the OHS consequence of a given severity, and the likelihood of that particular consequence occurring.

Risk Assessment: means the process of evaluating the likelihood and consequences of injury or illness arising from exposure to identified hazards associated with plant.

Supplier: includes a person who supplies plant for use in a workplace or plant intended to be used in a workplace, by way of sale, lease, exchange or hire, whether as a principal or agent for another.

Use: means work from, operate, maintain, inspect and clean.

Note: Refer to NOHSC: 1010 (1994) for full range of definitions

Appendix C Registrable Plant

List of plant requiring registration of design as outlined in Schedule 5 (Part 1) of the WHS Regulations

- Pressure equipment, other than pressure piping, and categorised as hazard level A, B, C or D according to the criteria in Section 2.1 of *AS 4343 Pressure equipment – hazard levels*
- Gas cylinders covered by Part 1.1 of *AS 2030.1 Gas cylinders - General Requirements*
- Tower cranes including self-erecting tower cranes
- Lifts, including escalators and moving walkways
- Building maintenance units
- Hoists with a platform movement exceeding 2.4 metres, designed to lift people
- Work boxes designed to be suspended from cranes
- Amusement devices covered by Section 2.1 of *AS 3533.1:2009 - Amusement Rides and Devices*, except Class 1 structures (see below)
- Concrete placement units with delivery booms
- Prefabricated scaffolding and prefabricated formwork
- Boom-type elevating work platforms
- Gantry cranes with a safe working load greater than 5 tonnes or bridge cranes with a safe working load of greater than 10 tonnes, and any gantry crane or bridge crane which is designed to handle molten metal or Schedule 10 hazardous chemicals
- Vehicle hoists
- Mast climbing work platforms
- Mobile cranes with a rated capacity of greater than 10 tonnes

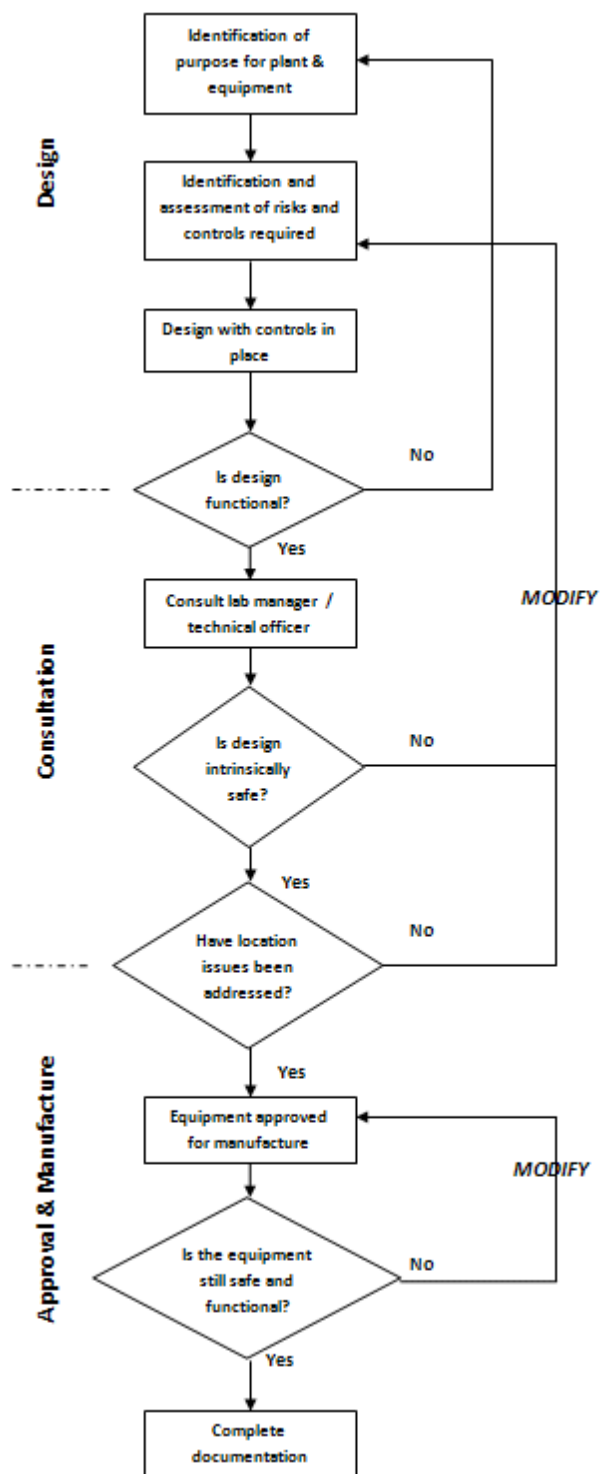
Plant that does not require registration includes:

- heritage boiler
- crane or hoist that is manually powered
- elevating work platform that is a scissor lift or vertically moving
- tow truck.

List of plant items requiring registration as outlined in Schedule 5 (Part 2) of the WHS Regulations

- Boilers categorised as hazard level A, B or C according to criteria in Section 2.1 of *AS 4343 - Pressure equipment - hazard levels*.
- Pressure vessels categorised as hazard level A, B or C according to the criteria in Section 2.1 of *AS 4343 - Pressure equipment - hazard levels*, except for gas cylinders; LP Gas fuel vessels for automotive use, and serially produced vessels.
- Tower cranes including self-erecting tower cranes.
- Lifts, including escalators and moving walkways.
- Building maintenance units.
- Amusement devices covered by Section 2.1 of *AS 3533.1:2009 - Amusement Rides and Devices*, except for certain Class 1 structures (see below).
- Concrete placement units with delivery booms.
- Mobile cranes with a rated capacity of greater than 10 tonnes.

Appendix D: Design and Modification Flowchart



- Identification of machine specifications
Involvement of:
- Specialist personnel
 - End user / operator
- Identification of risks:
- Mechanical, physical, chemical etc.
 - Use of specialist personnel
 - Involve end user / operator
- Consult
- UNSW risk management process
 - Relevant regulations and standards
- Use intrinsically safe principles
Use hierarchy of control to eliminate or reduce risk
Design with multiple hazard controls to provide highest level of protection
- Review practicality of controls in place
- Ensure machine function is not impeded by controls
 - Ensure safety of operators & those in the local environment
- Manager reviews
- Design and location considerations
 - Risk management process
- Relevant stakeholders consulted on design and final location
- Adequate intrinsic safety in design
- Interlocks and isolation devices
 - Guarding
 - Ergonomic design
 - Emergency stop & warning devices
- Risk assessments completed
- Operational limitations
- Services required
 - Space availability and location
 - WHS and environmental concerns, i.e. waste, access, security, noise, vibration
- Delivery and commissioning details
- Resource
 - Mechanical aids
- Manager of equipment / project
Lab manager
Professional & Technical staff
- Operational limitations
- Services required
 - Space availability and location
 - WHS and environmental concerns, i.e. waste, access, security, noise, vibration
- Delivery and commissioning details
- Resource
 - Mechanical aids
- Documents and risk management for:
- Installation & commissioning
 - Operation & emergency procedures
 - Decommissioning of equipment / machine
- Follow installation, commissioning and installation guidance material