A guide to managing safety

Piling work and foundation engineering sites

Industry standard

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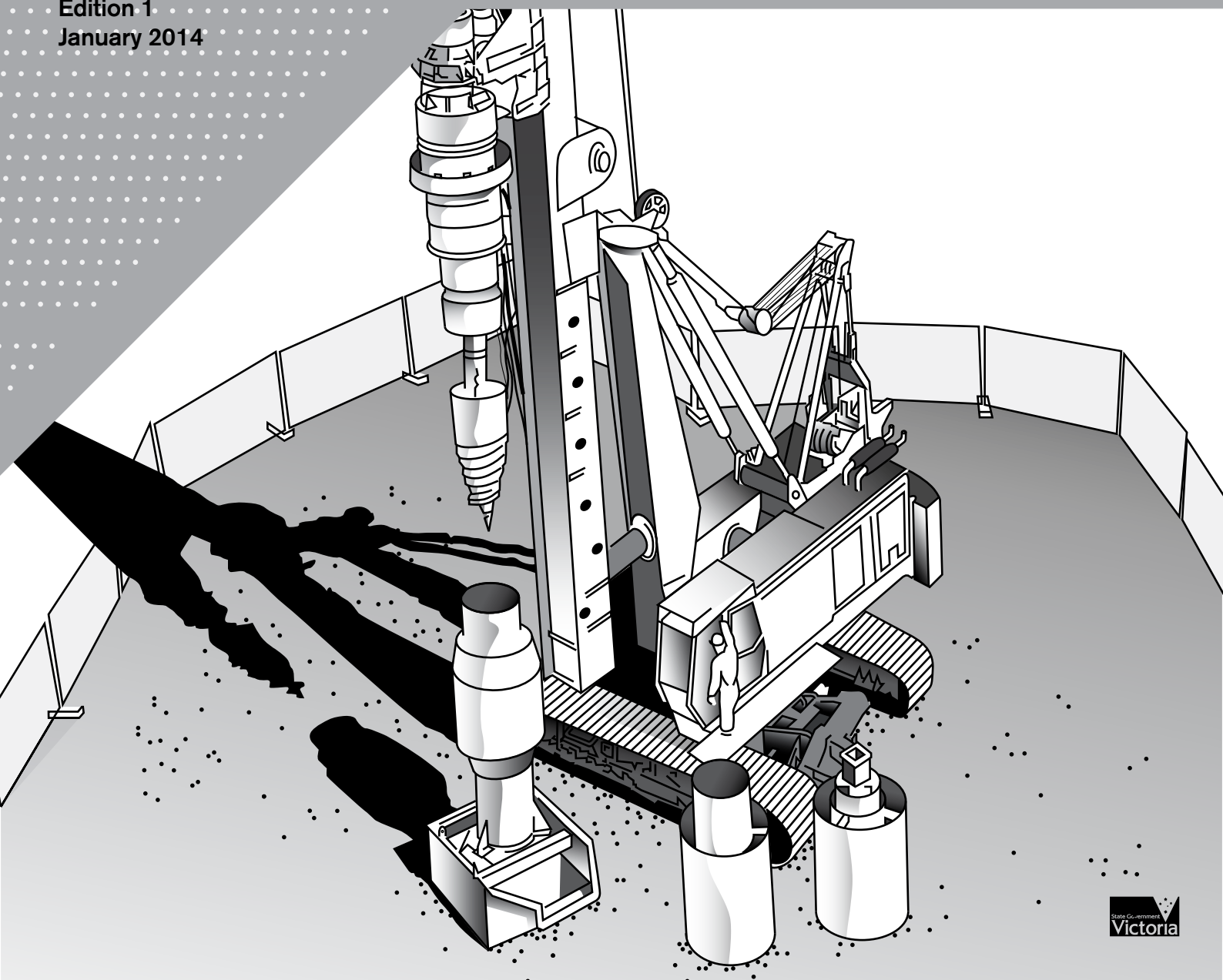

Contents

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1. Introduction

1.1 Background

Piles and deep foundation engineering (PF work) includes a number of piles, ground improvement and retaining wall techniques.

Piles transfers loads from a structure (including a retaining wall) to a suitable soil or rock profile and includes bored piles, contiguous flight auger piles, displacement piles, driven piles, sheet piling, diaphragm walling, barrettes and grout piles.

Ground improvement is the practice of improving the soil profile (to carry loads), slope stability and other uses. It includes dynamic compaction, dynamic replacement, controlled modulus columns, soil mixing, stone columns, vertical drains and vibro compaction.

Piling and foundation engineering equipment (PF rigs) can be used to install more than one of the above techniques. Some PF rigs can be configured to install different types of displacement and replacement piles as shown in the figure below.

Examples of PF works include:

- building and bridge foundations
- site retention
- ground and slope stabilisation
- foundations for engineering structures
- civil and environmental works.

1.2 Purpose

This industry standard provides practical guidance on health and safety to the piling and foundation engineering industry. It covers the safe operation and maintenance of PF equipment, and training of employees.

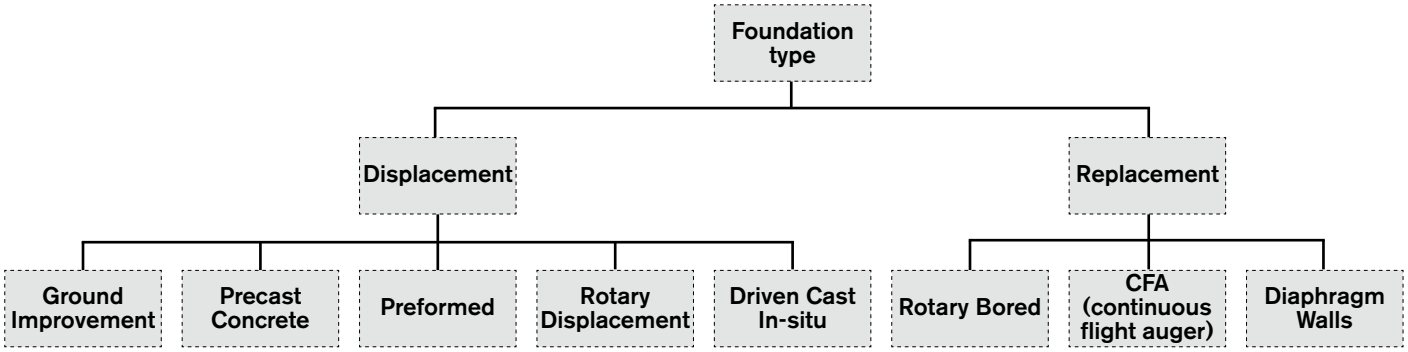
It sets out industry-wide guidelines for establishing and maintaining a safe working environment wherever PF plant and equipment is used.

This industry standard is based on the current state of industry knowledge and construction methods. It is not intended to exclude other methods or processes that meet the requirements of providing a safe workplace. It is also not intended to be an all-encompassing design, maintenance and operation manual.

Note: This industry standard should be read in conjunction with the industry standards, *Precast and tilt-up concrete for buildings* and *Concrete pumping*.

1.3 Who should use this industry standard?

This industry standard should be used by employers and workers in the PF industry. It can also be used by principal contractors or others who may be managing PF works and by health and safety representatives (HSRs).



2. The law

2.1 General

The law requires employers to provide and maintain a work environment that is safe and without risks to the health of employees (including independent contractors and their employees), so far as is reasonably practicable, including:

- providing or maintaining plant or systems of work that are safe and without risks to health (eg implementing inspection and maintenance regimes for PF rigs, and other PF equipment)
- making arrangements for the safe use, handling and storage or transport of plant
- maintaining the workplace under their management and control in a condition that is safe and without risks to health
- providing adequate facilities for the welfare of employees at the workplace under their management and control
- providing employees with information, instruction, training or supervision that is necessary for them to work safely and without risks to their health
- monitoring the conditions at workplaces under their management and control.

Duties are also imposed on suppliers of plant who know, or ought to reasonably know, the plant is to be used at a workplace. These duties extend to hirers and booking agents of PF equipment.

2.2 Status of this industry standard

This industry standard provides information to assist duty holders in the PF industry to provide and maintain safe workplaces and achieve a minimum level of health and safety compliance. An alternative method may be followed if it achieves an equivalent or higher level of occupational health and safety (OHS). Where the word 'must' is used, the guidance must be followed, so far as is reasonably practicable.

2.3 Reporting incidents to WorkSafe

An employer or self-employed person must immediately notify WorkSafe after becoming aware of an incident at a workplace under their management and control that resulted in:

- a workplace fatality
- an injury requiring immediate medical treatment
- treatment by a medical practitioner within 48 hours of exposure to a substance
- other incidents (see *Guide to incident notification*) where a person was exposed to an immediate risk, including:
  - the collapse, overturning, failure or malfunction of, or damage to registered plant
  - the collapse or failure of an excavation, or any shoring supporting an excavation
  - the collapse or partial collapse of any part of a building or structure
  - the fall or release from height of any plant, substance or object.

An employer or self-employed person must ensure the site is not disturbed until a WorkSafe inspector permits it, except for:

- protecting the health and safety of a person
- aiding an injured person
- taking essential action to make the site safe
- preventing further occurrence of the incident.

The employer or self-employed person must also give WorkSafe a written record of the incident within 48 hours of becoming aware of such an incident. The incident form can be completed online at **worksafe.vic.gov.au**.

3. Planning for safety

3.1 General

Planning and preparation should be done early in the development of each project and include consultation with relevant stakeholders such as the principal contractor (PC), piling and foundation contractor (PFC), services authorities, geotechnical consultants, structural engineering consultants, demolition contractors and other relevant subcontractors.

A project should be considered in its entirety when considering how to control risks and how many employees to engage.

3.2 Consulting employees

Employees must be consulted on OHS matters that directly affect them. This includes identifying hazards and risks, and determining risk controls. If employees are represented by an HSR, the consultation must involve the HSR. Employers should involve all employees in the development of safe work procedures such as hazard identification, risk assessment and risk control methods.

3.3 Principal contractor

The PC is responsible for the overall site safety and should coordinate with other site employers on the management of site safety, including the PFC and other contractors impacted by piling work. The PC should ensure other persons onsite or the public are not put at risk from piling work and associated activities.

The PC must ensure everyone onsite is aware that PF works will be taking place and the site safety rules around the associated hazards.

3.4 Site management

Each employer on-site needs to effectively manage the safety of their employees, plant and equipment. These duties remain even when they overlap with those of other employers.

For example, if a PC has a supervisor on-site the PFC must still supervise their employees to ensure their work is being done safely.

Employers should have processes in place to effectively manage the work over which they have management or control, including processes to ensure:

- safe work method statements (SWMS) are developed for all high risk construction work
- safe work practices are developed for other tasks where there is risk to employees or the public
- employees are competent or are directly supervised by competent employees
- site conditions are monitored (eg risks are controlled or new hazards are not introduced)
- employee welfare is monitored (eg amenities are adequate and maintained).

If using powered plant ensure it is mechanically sound, safe for use and has the required safety documentation.

3.5 Hazard identification and risk management

An employer must eliminate risks to health or safety associated with PF work, so far as is reasonably practicable. If the risk cannot be eliminated then the employer must reduce the risk so far as is reasonably practicable.

Employers must have effective systems in place to identify hazards and determine whether there are significant risks that require further action.

To ensure appropriate hazard management the employer should, in consultation with an HSR (where applicable) and employees involved in the work, do an assessment of the risks. Once a risk has been identified, employers must implement, monitor and review risk control measures.

A risk arises when it is possible that a hazard will actually cause harm. In order to assess risk, employers must consider the likelihood of harm occurring and the possible consequence of that harm.

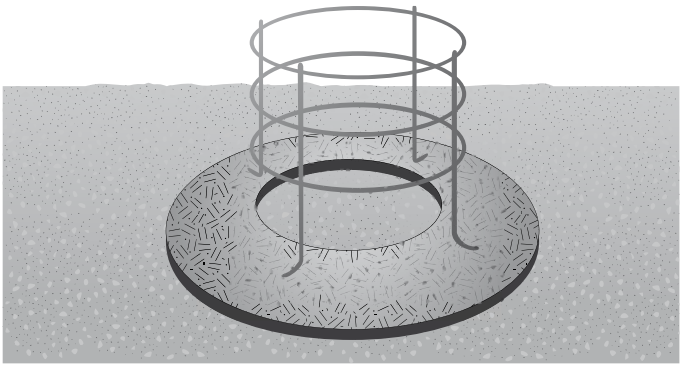
When assessing the likelihood of harm occurring, factors such as how much, how often and over what time period a person is exposed should be considered. A risk assessment should be made on the basis of knowledge and experience of the hazard across the industry.

Risks will be present when handling, transporting, erecting and operating piling and foundation equipment. Although component failure is rare, the potential consequences are significant.

3.6 Hazards

Some of the most common high consequence hazards to be managed during PF work include:

- falls, including when inspecting or maintaining piling rigs and falls into pile holes or excavations
- being struck by powered mobile plant, including working in close proximately to PF rigs and delivery vehicles
- contact with utilities services (eg overhead powerlines and underground cables or pipes)
- entanglement in the rotating parts of the PF rigs
- crushing when moving materials, including when unloading piles from trucks and stacking them onsite
- collapse of partially assembled PF rigs
- falling loads due to use of inappropriate lifting gear.



Typical pile hole guard with footplate

3.7 Controlling the risk from hazards

Where there is a risk to health and safety, employers should eliminate the risk so far as is reasonably practicable.

If the risk cannot be eliminated, the risk must be reduced so far as is reasonably practicable by:

- implementing any mandated controls specified by law
- substituting a new activity, procedure, plant process or substance (eg change to another type of piling rig or piling method)
- isolating persons from the hazard
- using engineering controls
- a combination of the above.

Control any remaining risk by using:

- administrative controls (eg provide specific safety training, work instructions, post warning signs)
- personal protective equipment (PPE) such as high-visibility clothing (eg reflective types), hearing and eye protection (eg safety sunglasses, ear plugs), work gloves, protective head and footwear (eg helmets and safety boots)
- a combination of the above.

Note: The processes for managing risk for other specific hazards such as noise or asbestos are set out in the Occupational Health and Safety Regulations 2007.

Control measures must be discussed with employees and evaluated to ensure they are effective and do not create additional hazards.

3.8 Common injuries

Plan how to manage the cause of common injuries, such as manual handling of materials or equipment, using high force, slips and trips, and falling into excavations, off ladders or from mobile plant.

Factors that can increase the risk of injury when handling large, bulky or heavy items (eg generator sets, pumps, pipes and hoses) are:

- poor planning
- poor storage or location of equipment
- moving over rough, boggy or loose surfaces and terrain
- poor access to the work or storage areas
- poor layout of storage areas
- excessive distance items need to be moved
- obstacles that have to be negotiated
- location or design of storage on vehicles
- using high force or sustaining awkward postures or movements.

Factors that can increase the risk of slips, trip and falls are:

- poor site housekeeping
- climbing onto and getting down from mobile plant
- inadequate and poorly maintained access areas
- mud on the floors of facilities and on the steps of mobile plant
- climbing in and out of excavations or crossing rough terrain
- excavations that are not adequately barricaded
- worn or inappropriate footwear.

3.9 Safe work method statements

Most PF work will be high risk construction work due to the use of powered mobile plant, working at heights and excavation work. Before doing high risk construction work, a safe work method statement (SWMS) must be developed for each high risk task and then followed.

If a generic SWMS is used, it must be reviewed and modified as necessary before the task starts to reflect the specific site conditions. It should also record where the task is being performed and the date of review. The SWMS must also be reviewed if site conditions change and modified as required.

The SWMS describes how the task is to be done safely and must:

- identify the task
- identify the health and safety hazards, and risks arising from the task
- describe how the risks will be controlled
- describe how the risk control measures will be implemented
- identify who is responsible for ensuring each control measure is implemented and maintained.

The SWMS process and template can also be used to document other safe work procedures.

When developing a SWMS, consider the following aspects of the planned work:

- PF rig selection
- crane selection or configuration
- PF work platform design
- appropriate lifting gear accessories (eg size, type and condition of slings)
- site access/constraints
- other site operations
- environment
- proximity to the public, roads, railways, underground utilities and overhead assets
- training and qualifications of site team
- briefing of site team
- site working hours (eg night work)
- pile type and construction method.

3.10 Safety management

The PC and PFC should consult on the piling works and agree on the responsibilities for managing safety for each activity associated with the work. The PC should clearly identify who will be responsible for managing safety for each of these activities and coordinate with the PFC to ensure the risks are effectively controlled.

Employers should develop plans and procedures to manage the works and associated risks, including:

- internal and external vehicle or plant traffic
- loading/unloading of plant, cages and piles (eg designating 'lay-down' areas for storage of materials)
- maintenance and operation of the PF rig
- erection and disassembly of the PF rig
- high risk construction work (eg preparation and implementation of an SWMS)
- operational safety and exclusion zones around PF equipment
- access to and around the site to reposition the PF rig
- plant and equipment
- PF working platform (eg design, certification and maintenance)
- ground penetrations and pile holes (eg fall protection)
- falls from height and falling objects
- underground and overhead services (eg locating, marking, relocating, protecting or isolating)
- emergency procedures
- affects of the works on nearby buildings, structures or excavations
- movement of mobile PF plant (eg into areas not visible to the operator)
- suitablity of ground conditions for plant movement or PF work activities
- protection of the public.

Employers should also consider how many suitably trained workers they need to allocate for each activity.

3.11 Foundation technique selection

During the planning phase of the project, select the most appropriate foundation technique for the site.

When determining the technique consideration should be given to all the site factors, including:

- requirements of the proposed structure and applied loadings
- ground conditions
- environmental factors, such as nuisance to the public, effect on wildlife and their habitat, noise or vibration and waste products (eg spoil)
- site access, location and size
- proximity to existing assets, such as utilities, roads, railways and sensitive structures
- ground contamination
- water table.

A competent person should assess the suitability of specific PF equipment for the particular job.

3.12 Design of working platforms

A critical factor in any foundation technique is the surface required to support the PF rig and ancillary equipment (working platform) during operation or when moving about the site. Inadequate working platforms can cause PF rigs to become unstable and collapse with catastrophic results, including the potential for multiple deaths or injuries to PF employees, other people onsite and members of the public.

The PC, PFC and other contractors must ensure the working platform is adequate, as all have legal duties associated with providing a safe workplace (see 2.1). During the planning phase consult and agree on the minimum design requirements for the platform, and ensure a competent person (eg a geotechnical engineer) designs the working platform.

A key factor of platform design is the maximum bearing pressure generated by the PF rig or ancillary equipment. The PF contractor should provide this information and other relevant equipment specifications to ensure a suitable platform is designed.

Equipment bearing pressure calculations should be based on those experienced during operational activities, rather than weight to track area that can be significantly lower than those experienced during operation.

3.13 Communication

Communication between the PF rig offsider, the rig operator, supervisors and other employees is essential and may include:

- **non-verbal** - visual signals or audible signals (eg whistles) that cover the piling rigs functions. If using hand signals and you are out of view of the operator, you should be assisted by another offsider to relay directions
- **verbal** - standard operational phrases or the optional use of a dedicated two-way radio system.

Note: Competencies that cover effective communications can be found in the dogman training package.

4. Set-up and operation

4.1 Location

After consulting with the relevant contractors, employees and HSRs involved with the PF work, the PFC should ensure the location selected for the equipment set-up is suitable, including:

- the area is accessible and any slopes are within the operating capacity of the equipment
- the surface is firm, able to support the weight of the operating PF equipment and any delivery trucks
- the area is clear from obstructions and excavations
- the equipment can be operated without encroaching the 'no-go zone' areas near overhead powerlines
- underground services or buried structures are identified (eg obtaining information from the PC)
- an effective operational safety zone can be established
- if any public protection needs to be implemented.

4.2 Equipment

Ensure all mobile plant, including PF rigs are in a mechanically sound condition and have:

- comprehensive operator's instructions or the manufacturer's operation manuals
- correctly positioned and legible warning/safety signs or stickers
- all required safety equipment fitted
- an adequate supply of packing for any stabiliser base plates
- current plant risk assessment
- up to date equipment maintenance logbooks
- WorkSafe Victoria registration or interstate equivalent where applicable (eg mobile cranes with a safe working load rating over 10 tonnes even when fitted with a pile driver attachment).

Detailed maintenance and inspection records do not have to be with the plant but should be available, if requested.

4.3 Piling and foundation working platforms

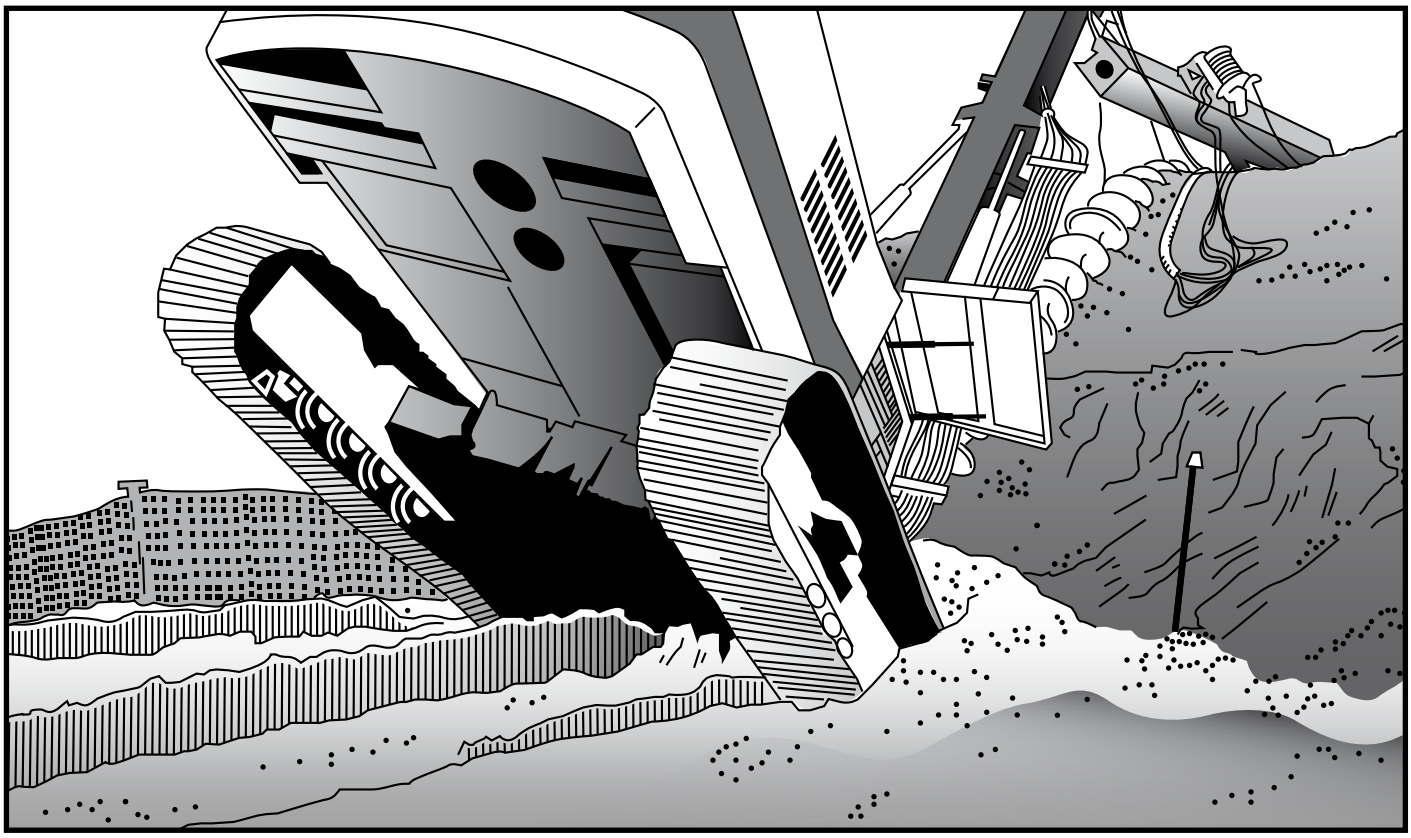
As PF rigs can be 120 tonnes in weight and 44 metres high, it is critical the rig remains stable while operating and during movement. To ensure rig stability a competent person (eg a geotechnical engineer) should inspect the platform after it has been constructed and approve it for use. The competent person should state in writing the platform's maximum plant loading capacity and/or the specific equipment that it has been designed to support (see appendix B for a working platform certificate example).

Provide the plant operator with a copy of the working platform approval document, prior to the PF rig accessing the platform. The operator should review and keep the approval so it is readily available throughout works.

Before using another rig other than the one designed for that platform, verify the rig is suitable for the platform. Due to weight to track area ratios, smaller rigs often have higher bearing pressures than larger rigs.

Ensure no PF works occur in areas where other site activities (eg trenching) have affected the integrity of the platform. PF work can only occur in the affected area when the platform has been fully reinstated and approved for use by a competent person.

The working platform should be monitored and maintained for the duration of the piling work to ensure it does not deteriorate and continues to function as originally designed.



PF rig collapse due to working platform failure

4.4 Assembly and disassembly of rigs

The PFC should develop or have access to detailed procedures for the assembly and disassembly of the PF rig. These procedures should be based on:

- the manufacturer's recommendations
- controlling the risks of working at height
- working around powered mobile plant
- ensuring the PF rig's structural stability during the process
- verification that the equipment is correctly assembled.

A SWMS must be developed before the work starts and followed during the assembly or disassembly process. Employees must be appropriately licensed, trained and instructed in the assembly or disassembly procedures for the specific piling rig and supervised to ensure they work safely.

4.5 Operational safety zones

Establish an operational safety zone around the PF works to keep PF activities separate from other onsite construction activities and to separate mobile plant from people.

Only those involved in the PF work should enter the safety zone. Precautions should be in place to prevent unauthorised persons or mobile plant from accessing the safety zone area.

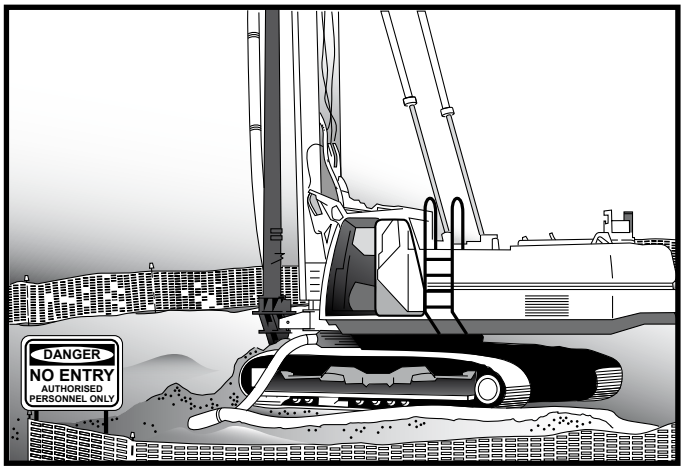
Operational safety zones should be clearly marked by a physical barrier and signage. If a physical barrier is not reasonably practicable, the operational safety zone boundary should be indicated with appropriate signage warning people to keep out.

An operational safety zone should be large enough to provide adequate clearance distances to prevent mobile PF plant from impacting other site works or activities.

When establishing the operational safety zone, consider the risks from the work including:

- the working radius and movement of all mobile plant participating in PF work
- separation of hazards from adjacent non-PF activities such as excavations, site traffic thoroughfares, pedestrian access walkways and other construction activities (eg demolition)
- any specific exclusion zones in place as part of the PF works
- safe access and egress to and from the operational safety zone.

The operation safety zone must be included as one of the controls for working in the vicinity of powered mobile plant in relevant SWMS.



PF rig enclosed in operational safety zone

4.6 Exclusion zones

Within the operational safety zone smaller areas should be established as exclusion zones to identify high risk areas adjacent to or within the working radius of PF rigs that persons should not enter when the equipment is in operation.

Exclusion zones are administrative controls and the PFC must supervise the work, as necessary, to ensure their employees are observing the exclusion zone restrictions.

The exclusion zone must be included and described (eg radius or area) in the relevant SWMS.

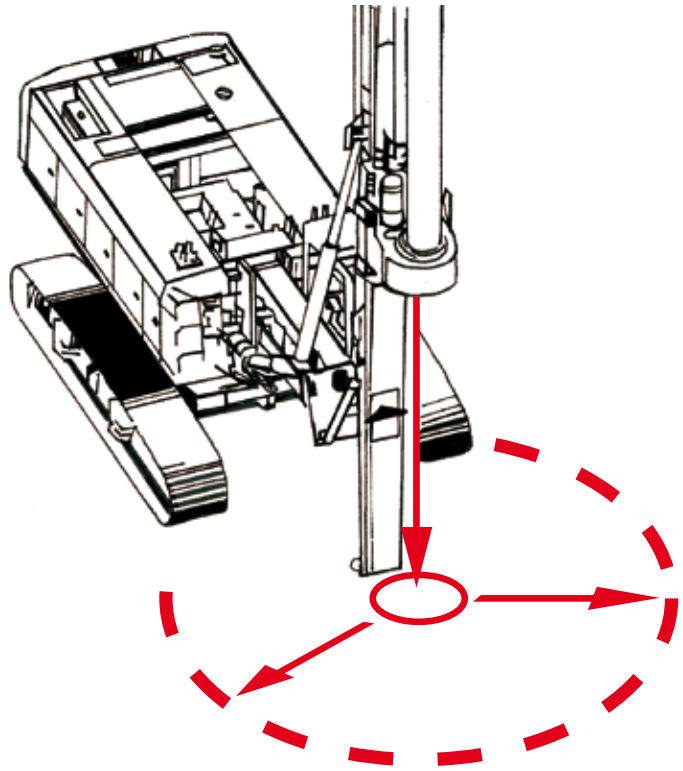
4.7 Powerlines and electrical equipment

When operating mobile plant near overhead powerlines the SWMS must detail how you will do the task safely, including how you will comply with the requirements of the 'no go zone' rules.

No part of a mobile plant or its load should come closer than 6.4 metres of pole-mounted powerlines or eight metres of a tower-mounted line, unless complying with 'no go zone' rules. Ensure excavation works or working platform construction does not alter ground levels or reduce safe clearances under powerlines.

See WorkSafe's guidance, *Using earthmoving equipment near overhead electrical assets* for information on work near pole-mounted powerlines. For work near transmission towers or within the tower easement, contact the asset owner.

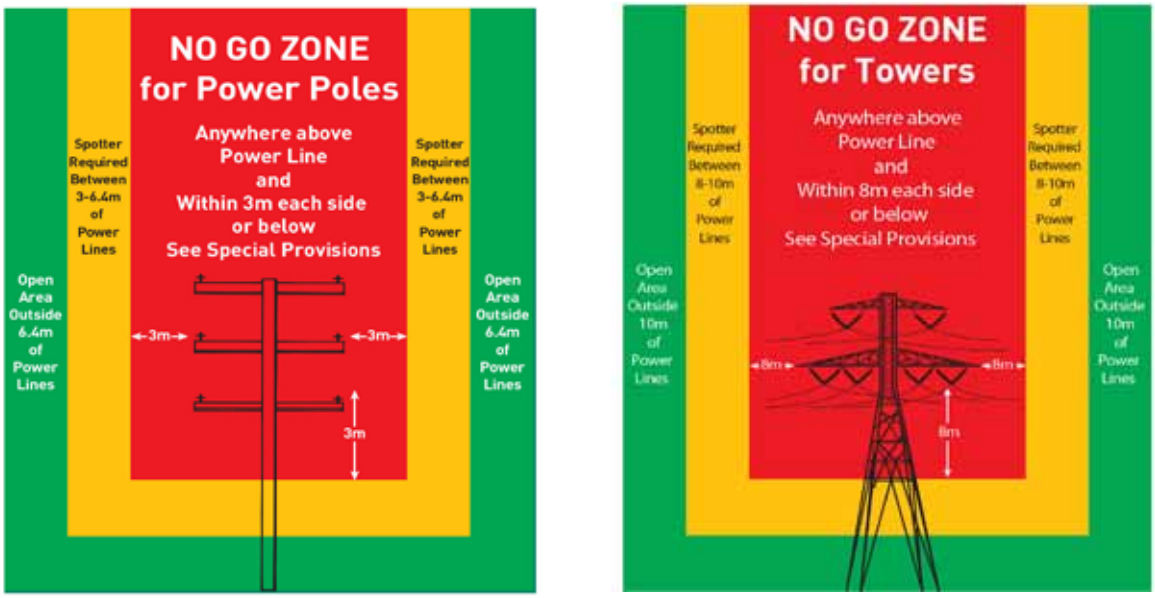
When working near electrical equipment, allow adequate clearance around sub-stations, service pillars and lighting poles. Powerlines and electrical equipment is considered 'live' unless the asset owner confirms in writing that electricity has been isolated.



Example of an exclusion zone

4.8 Underground services and buried structures

If operating PF equipment near underground services or other buried structures, the locations should be marked and readily identifiable to PF plant operators.



No-go zone clearance from overhead electrical cables

4.9 Delivery drivers

When delivering to a site, it is essential that all plant and material delivery drivers follow the directions of the employees responsible for controlling traffic and the PF process. This is critical when multiple trucks are discharging or manoeuvring at the PF site. Drivers should:

- ensure visible and audible warning devices work
- stand clear of PF mobile plant, where practicable
- wear seatbelts
- wear required PPE (eg high visibility/reflective safety vests)
- keep to designated vehicle routes
- obey speed limits and traffic directions, and keep clear of other plant
- report safety concerns/problems to the PF supervisor for action
- understand and comply with the site traffic management plan.

5. Workers supervision and training

5.1 General

Employers must ensure employees are provided with information, instruction and training that is necessary to enable them to work safely, including instruction or training on the employer's safety procedures. Training should include ongoing or refresher training provided periodically to ensure work continues to be performed safely.

5.2 Work supervision

Employers must supervise their employees and the work over which they have control. This includes directing and monitoring the work to ensure it is done safely.

To effectively supervise safety, it is important supervisors have:

- an appropriate level of OHS knowledge
- knowledge of and experience in the work being done
- an understanding of their role and expectations of them
- an appropriate level of management and supervisor skills
- an understanding of safety procedures, acceptable industry practices and this industry standard.

5.3 Competencies

Employers must ensure workers are provided with information, instruction and training that is necessary to enable them to work safely, including a construction induction (CI card) and instruction or training on the employer's safety procedures.

Verify workers also have:

- a current WorkSafe high risk work licence if doing high risk work (eg rigging) or operating high risk plant (eg mobile cranes)
- other required licences or worker registrations (eg VicRoads)
- if operating plant, competencies for the plant being used and any specialised attachments (eg PF rig with whip line)
- the necessary training to undertake the task safely.

Skills and competencies should be verified before the workers arrive at site or before the work begins.

5.4 Management of training and skills

Employers should keep a register of employee competencies and licenses. Where employees do not have competencies or skills required for specific tasks associated with PF operations, appropriate training and/or instruction must be provided to enable each employee to do their work safely.

Where internal training is provided, either a formal or informal supervised training plan should be developed for each employee. The plan should have details on how competencies are to be assessed, such as the minimum hours of supervised training the employee will require to become proficient in the operation of major items of plant (eg PF rigs).

Successful completion of specific learning outcomes and other training should be documented as evidence of employee competency.

Persons supervising training or providing mentoring should be competent and experienced in the particular task or in the operation of the plant, and if required hold the appropriate high risk work licence.

Trainees should not be allowed to operate PF equipment unsupervised.

Recognition of prior learning can be achieved with the assistance of training and assessment qualified personnel. This is relevant to operators who have acquired on-the-job experience before the implementation of formal training within a company. Under these circumstances the operator might progress direct to the assessment (see appendix C).

5.5 Familiarisation training

Similar PF equipment can be fundamentally different in their design, mode of operation, control layout and configuration. Before allowing a person to operate any PF equipment, the employer must ensure suitable and adequate training on the specific equipment, including any attachments, has been provided.

The employer should provide familiarisation training to equipment operators, offsiders, dogmen, riggers, mechanics, fitters, employees and supervisors when they start work with the employer, if the employer introduces new equipment or they have not worked with the equipment before.

This training provides employees with the opportunity to become familiar with the equipment controls, operational parameters, assembly procedures and the employer's systems of work for the specific equipment.

5.6 Workers supervising trainees

Employers must ensure supervisors maintain a high level of supervision of trainees in order to take immediate action to contain or rectify a dangerous situation.

The supervisor should be authorised by the employer before undertaking the supervisor role.

6. Equipment, inspection and maintenance

6.1 General

Regular inspections and preventative maintenance of PF plant and equipment are essential for the safe and efficient operation, and to ensure mechanical integrity of all components. Failure of key components may cause an incident and possible collapse of the rig or its parts.

A maintenance and inspection program should take into account the plant's working environment and usage. It should be based on the manufacturer's recommendations or designed by a competent person to either achieve the same safety outcomes or compliance with the relevant Australian Standards.

The maintenance program should include:

- pre-operational inspections and tests
- routine inspection, servicing and maintenance at specified intervals
- periodic/annual inspections
- major inspections at specified intervals
- all items listed in the manufacturer's manual.

The following should be recorded in the plant's service book and in more detail in the maintenance records:

- inspections and maintenance
- defects found and repairs undertaken
- structural alterations.

Note: A copy of the manufacturer's manuals should be kept in the PF rig before any PF works starts. PF rig contractors should ensure service records and maintenance manuals are maintained, kept in a safe and accessible place for the life of the plant, and provided to the purchaser when the plant is sold.

6.2 Pre-operational inspection

A pre-operational inspection should be done prior to the start of each shift and include inspecting and/or testing:

- all relevant items indicated in the operations and/or manufacturer's manual, or attached to a daily check sheet
- plant access
- clear visibility from the operator's position
- operating and emergency controls
- brakes
- safety switches and interlocks, including limiting and indicating devices
- visual inspection of the structure, including pipelines and connections (where applicable)
- wire ropes to ensure they are on the drum, correctly reeved on the sheave and in good condition.

The results of the inspection must be entered into a logbook and kept with the piling rig. All safety-related faults must be reported and corrected before the piling rig is used, and recorded at an appropriate time.

6.3 Routine maintenance

All PF rigs should be inspected and maintained by a competent person at intervals specified in the maintenance program. The competent person should ensure the maintenance is done to the manufacturer's requirements and the specified items are inspected and/or tested. This includes:

- emergency devices
- operator controls
- components associated with lifting (eg wire ropes and sheaves)
- interlocks and travel limiting devices
- access to the machine for operation and maintenance
- critical components (eg brakes, gears, fasteners, pins and shafts
- track wear
- areas affected by corrosion, damage, wear or abrasion
- rig and its components after transportation (eg return from site)
- metal fatigue in critical wear or stress points
- additional items required for inspection by the manufacturer.

6.4 Annual inspection

A competent person should inspect each PF rig at least every 365 days. The competent person's inspection should review the routine maintenance reports and verify any identified defects and faults have been repaired.

To ensure the PF rig is safe for continued operation it should be inspected and tested based on the rig's age, usage and known critical wear areas or components.

In the absence of verifiable records of previous maintenance, inspection repairs or modifications, the PF rig should be assessed to its suitability from continued service.

Note: The annual inspection can be done during routine maintenance.

6.5 Major inspection

Owners of older PF rigs must ensure their equipment is safe for continued service, as the rig or some critical components of the rig may have exceeded their design life. The frequency of assessments for continued service (major inspection) should be based on the manufacturer's recommendations or the requirements of a competent person experience in the type of plant.

The competent person should inspect all high stress areas, critical mechanical and structural components, including visual, selected strip-down and other testing (eg non-destructive testing) as required or necessary to make an accurate assessment of the plants condition.

The major inspection can be incorporated into the maintenance and inspection program.

The competent person should provide a written report on the details of the inspection for the rig owner's records. The report should be signed by the competent person and state the specific PF rig is safe for continued service and when the next major inspection is required.

Cranes, even when used with PF attachments, must achieve compliance with AS2550 *Cranes, hoists and winches— Safe use* series.

6.6 Competent person for inspection

A competent person should have the knowledge, skills and the experience necessary to accurately assess the condition of the plant and its components. Different skill sets may be required depending on the inspection criteria or the components being inspected.

The competent person could be an independent consultant, the rig manufacturer or a person employed by the owner of the rig.

6.7 Non-destructive testing

Non-destructive testing (NDT) should be carried out by a competent person and should take place within a 12 month period and concentrate on structurally critical elements of the rig, such as structural welded connections on the mast. The results of NDT should be kept by the employer in the detailed maintenance records.

6.8 Repairs

Any repairs made to plant should be done according to the manufacturer's maintenance and repair manuals or detailed instructions from a competent person.

All repairs and any replacement of components should:

- be carried out by a competent person
- use original equipment manufacturer (OEM) parts or those that are compatible with OEM and with at least the same specifications
- be recorded in the service book and detailed in the maintenance records.

6.9 Welding

Welding of load bearing components, should be done by a suitably qualified welder to AS/NZS 1554 *Structural steel welding* and recorded in the service book and detailed in the maintenance records.

6.10 Plant modifications

The modifier of the plant may take on legal obligations of designer, manufacturer and supplier when they alter plant; including doing a risk assessment and providing safe use information.

Modifications to road carrier vehicles need to comply with the requirements of the National Transport Commission.

Engineering calculations may need to be done to verify the modifications comply with relevant technical standards and associated strength and operational requirements. Modifications with the potential to affect safe operation of equipment should be approved in writing by the manufacturer or a qualified mechanical engineer. Engineering calculations and approvals should be kept for the life of the equipment.

6.11 Maintenance records

Inspection and maintenance records should:

- clearly describe the work undertaken and parts replaced
- record the date of inspection and maintenance
- note who did the work and any recommendations for the preventative maintenance program register
- be signed by the person carrying out the work
- be kept for the life of the plant
- be readily available.

Note: Records should be transferred with ownership of the PF rig.

Further information

WorkSafe publications

Compliance Code, Prevention of falls in general construction

Code of Practice, Plant

Industry standard, Tilt-up and pre-cast concrete for buildings

Industry standard, Concrete pumping

WorkSafe position, How WorkSafe applies the law in relation to reasonably practicable

Controlling OHS hazards and risks

Working safely in the general construction industry

Guide to incident notification

Safe handling when securing loads on trucks

Preventing falls from earthmoving equipment

Using earthmoving equipment near overhead electrical assets

Other publications

Piling and Foundation Specialists Federation information, *Working platforms for tracked plant: good practice guide to the design, installation, maintenance and repair of ground-supported working platforms*

Definition of terms

AS: Australian Standard

AS/NZS: Australia/New Zealand (joint standard)

Competent person: A person who by their training, qualification or experience has the knowledge and skills to carry out the task (eg assessing the suitability of the piling rig).

Employees: All direct employees and any contractors and the contractors' employees.

Principal contractor: The owner of the project is considered to be the PC unless they appoint another person to manage and control the workplace, which means that person becomes the PC. This appointment should be in writing.

Non-displacement piles: Piles which are installed by removal and replacement of material.

Displacement piles: Pre-cast or pre-formed piles which are driven or screwed into the ground by piling hammering equipment. These displace the ground into which they are driven.

Reasonably practicable: In determining what is reasonably practicable in relation to ensuring health and safety, regard must be had to the following matters:

a) the likelihood of the hazard or risk occurring

b) the degree of harm that would result if the hazard or risk occurred

c) what the person concerned knows, or ought reasonably to know, about the hazard or risk and ways of eliminating or reducing the hazard or risk

d) the availability and suitability of ways to eliminate or reduce the hazard or risk

e) the cost of eliminating or reducing the hazard or risk.

SWMS: A safe work method statement outlines a process for identifying and controlling OHS risks. A SWMS must be prepared before undertaking high risk construction work if anyone's OHS is at risk because of the work.

Working platform: The surface at a construction site where piling and foundation equipment operates. The working platform is typically constructed from compacted soil or crushed rock.

Appendix A
Operator log book

Operator log book			Operator name:			Distribution: White copy – HR Yellow copy –log book
			Week from / / to / /			
Date	Job no	Actual operating hours	MACHINE DETAILS			Tasks undertaken (eg rigging/de-rigging, special operating procedure, general operations). NB if you are training someone else, or being trained yourself, please, detail the training here (eg training topic, tainer/trainee name).
			Type	Plant no.	Operating mode	

Please note: This form is to be completed by all personnel who operate any type of machinery submitted weekly to your supervisor

Operator name: _____ Supervisor name: _____

Operator signature: _____ Supervisor signature: _____

Appendix B
Piling working platform certificate

PILING AND FOUNDATION SPECIALISTS FEDERATION

WORKING PLATFORM CERTIFICATE

Project Name	
Section/Activity	

Part 1 – working platform design

Equipment to be used on site:	
Maximum plant loading:	

Note: Reference material developed by the Federation of Piling Specialists to assist with the calculation of bearing pressures is available on **pilingfederation.org.au** - (follow the prompts to Safe Working Platforms)

Part 2 – working platform installation

The Working Platform on the work site detailed above has been designed and installed to safely support the equipment detailed on this certificate and will be maintained and repaired, and reinstated to the as installed condition after any excavation or damage, throughout the period that the equipment is on the site.

Signature:		**Name:**	
Position:	**Principal contractor:**	**Date:**	
Organisation:		**Address:**	

A completed copy of this certificate signed by the principal contractor must be given to each user of the specific working platform prior to commencement of any works on that platform.

Received by Signature:		**Name:**	
	Principal contractor:	**Date:**	
Organisation:			

Appendix C
Sample training outline and assessment criteria for trainee rig operators

A trainee piling rig operator must demonstrate competence in the safe use and operation of the following	Yes/No
Safety operations ▪ Understands critical components and safety controls in the rig as per the operator's manual. ▪ Demonstrates a full understanding of the piling rig's safety devices as per the operator's manual.	
Emergency procedures ▪ Understands procedures to follow in the event of an emergency requiring shutdown of the piling rig. ▪ Is aware of what hazards constitute implementation of emergency procedures.	
Pre-start inspections ▪ Understands and has demonstrated all system checks to be carried out prior to starting the piling rig.	
Start-up procedures ▪ Carries out all pre-start checks and started piling rig as per manual. ▪ Has demonstrated the ability to shut down piling rig in a safe and secure manner.	
Position the piling rig ▪ Understands the relevant controls for moving the rig on site to a pile position. ▪ Has demonstrated the capability to manoeuvre the piling rig from a parked position to a pile position safely having due consideration for the surrounding conditions and safety of ground personnel.	
Assembly/disassembly operations ▪ Can explain and understand the steps involved in assembling and disassembling the rig. ▪ Demonstrates ability to carry out complete cycle of rigging and de-rigging in the field.	
Piling rig operations ▪ Understands all system checks to be carried out prior to starting the piling rig. ▪ Able to position, lower and engage drill tools in a safe manner for the purpose of piling.	
Relocate the piling rig ▪ Demonstrates a clear understanding of the walking capabilities of the rig, such as speed, ramp slopes, uneven ground. ▪ Can recognise suitability of working platforms and any limitations imposed on travel routes/ working areas.	
Maintenance ▪ Demonstrates the ability to monitor all aspects of the piling rig during operation to ensure faults are identified and rectified as soon as practical if fault can potentially compromise safety or cause damage to the piling rig.	

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- Piling and Foundation Specialists Federation (PFSF)
- Bauer Foundations Australia Pty Ltd
- BRC Piling & Foundations Pty Ltd
- Frankipile Australia Pty Ltd
- Geotech Pty Ltd
- Vibro-pile (Aust.) Pty Ltd
- Wagstaff Piling Pty Ltd
- Piling Contractors Pty Ltd
- Construction, Forestry, Mining & Energy Union (CFMEU)
- Master Builders Association of Victoria (MBAV)
- Victorian Construction Safety Alliance (VCSA)
- WorkSafe Victoria

Consultation with WorkSafe Victoria ensured overall compatibility with OHS legislation and technical alignment with Australian Standards. Foundations for Safety Victoria has endorsed this document as an industry standard in piling and foundation works. Foundations for Safety is a group comprising representatives from Victoria's key construction organisations.

Disclaimer

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