AUSTRALIAN FENCING AND GATE INDUSTRY

GATES & AUTOMATION

CODE OF PRACTICE

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Contents

1. Introduction

1.1 Acknowledgements

The National Code of Practice for Gates and Automation has been developed through the collaborative efforts of industry experts, professionals, and key stakeholders committed to improving safety standards within the Australian gate and automation industry.

This Code was made possible through the dedicated contributions of the Australian Fencing and Gate Industry Task Force, comprising manufacturers, suppliers, installers, and industry regulators who provided invaluable expertise and insights. Their collective knowledge and experience have helped shape a comprehensive guide that promotes best practices and enhances safety outcomes for all industry participants.

We also acknowledge the guidance of workplace health and safety authorities, technical advisors, and professional associations who contributed to the research and validation of this Code. Their input has been instrumental in ensuring alignment with current Australian laws, standards, and risk management principles.

This document reflects the shared commitment of the Australian Fencing and Gate Industry Task Force to fostering a culture of safety, compliance, and continuous improvement. While this Code is voluntary, it represents the industry's proactive approach to risk management and worker safety, setting a benchmark for responsible gate automation practices across Australia.

A special thank you is extended to all individuals and organisations that provided feedback and technical recommendations throughout the development of this Code. Your contributions will help create a safer, more informed industry for years to come.

1.2 Foreword

This National Code of Practice for Gates and Automation provides guidance on managing risks associated with the supply, installation, use, and maintenance of automated and manual gates in workplaces.

A Code of Practice offers practical guidance on achieving the required standards of work health and safety (WHS) under Australian law and outlines effective methods for identifying and managing risks. While voluntary, adherence to this Code can assist duty holders - including manufacturers, suppliers, installers, and workplace operators - in meeting their obligations under the Work Health and Safety Act (WHS Act) and WHS Regulations.

This Code is not legally binding but may be used as a benchmark in determining what is reasonably practicable under work health and safety legislation. Courts may consider this Code as evidence of known hazards, risk management practices, and duty of care. However, compliance with alternative methods that achieve an equivalent or higher standard of safety is acceptable under WHS laws.

For further interpretation of 'reasonably practicable', refer to the Safe Work Australia Interpretive Guideline available on the Safe Work Australia website.

1.3 Scope and Application

This Code is primarily intended for Persons Conducting a Business or Undertaking (PCBUs), offering practical guidance on managing health and safety risks related to gates and automation in workplaces. It is also relevant to designers, manufacturers, suppliers, installers, inspectors, asset managers, and other stakeholders involved in gates and automation processes.

While the focus is on automatic and manual gates, this Code also applies to allied processes that involve similar hazards and risk controls, such as:

- Electrical safety in automated gate systems.
- Mechanical risks associated with moving parts.
- Structural integrity requirements for supporting gate structures.
- Access control and security considerations.

This Code applies to all workplaces covered by the WHS Act across all Australian jurisdictions. It does not replace or override legal requirements but serves as guidance for best practice.

1.4 How to Use This Code of Practice

This Code references legal obligations under the WHS Act and WHS Regulations for convenience, but it does not replace or serve as a legal document.

- The terms ‘must’, ‘requires’, or ‘mandatory’ indicate a legal requirement under WHS law.
- The term ‘should’ signifies a recommended course of action.
- The term ‘may’ indicates an optional course of action that can enhance safety outcomes.

1.5 Overall Disclaimers

1. **Voluntary Compliance** - This Code is not a legal standard but a voluntary guidance document. Compliance does not automatically guarantee legal compliance with WHS laws.
2. **No Legal Liability** - The authors, industry stakeholders, and distributors of this Code accept no responsibility or liability for any loss, damage, injury, or legal consequences arising from its use.
3. **Alternative Methods Permitted** - This Code outlines one approach to risk management; other methods that meet or exceed safety requirements under Australian law may also be used.
4. **Jurisdictional Differences** - While developed as a national code, specific state or territory laws and regulations may impose additional or varying requirements. Users must verify compliance with local legislation.
5. **No Warranty of Compliance** - This Code does not guarantee compliance with all regulatory requirements, including electrical, structural, or engineering standards beyond those referenced herein. Users are responsible for seeking professional advice where necessary.

2. Definitions (Glossary of Terms)

Term	Definition
Access Control System	An electronic security installation controlling gate operation to authorised users within specific parameters.
Actuator	A mechanical device that moves or controls a gate or barrier, powered by electricity, hydraulics, or pneumatics.
Anti-Fall Device	A safety mechanism (e.g. posts, brackets, secondary supports) that prevents a gate leaf from collapsing if hinges, wheels, or supports fail.
Audible Warning Device	A buzzer or alarm that activates when the gate is in motion.
Automatic Operation	Gate movement triggered automatically by an access system (e.g. keypad, card reader, loop detector). Requires full safety devices.
AS/NZS Standards	A set of Australian and New Zealand Standards providing guidelines for safety, design, and performance.
Automatic Gate	A gate that opens and closes with the aid of an electronically controlled motor, actuator or drive system. Does not require human input or force.
Barrier Arm Gate	A gate with a boom arm used to control vehicle access.
Bi-Fold Gate	A swing gate with a centre hinge, allowing two leaves to fold upon themselves.
Cantilever Gate	A sliding gate that operates without a ground track, supported by rollers and counterbalance mechanisms or structure.
Competent Person	A Person who has a demonstrable level of training, qualification, or experience.
Control Panel	The interface that manages gate functions, settings, and automation.
Crushing Hazard	The risk of injury from being compressed between a moving gate and a fixed object.
Edge Sensor (Safety Edge)	A pressure-sensitive strip installed along the leading edge of an automatic gate to detect obstructions and prevent crushing hazards.
Electronic Locking System	A motorised lock securing the gate in an open or closed position.
Emergency Stop Button	A control that immediately halts the gate's operation in case of danger.
End Stops / Travel Stops	Mechanical devices that prevent a gate from moving beyond its open or closed limits.
Entrapment Hazard	The risk of a person or object being caught and unable to escape from the gate's motion.
Fail-Safe Mode	A setting ensuring the gate moves to a safe position during a system failure (e.g. opens for escape) or prevents the gate from closing if a component has failed.
Fail-Secure Mode	A feature that keeps the gate locked closed in the event of power or component failure.
Foreseeable Misuse	Improper but predictable use of a gate (e.g. riding on a sliding gate). Must be considered in risk assessments.
Gate Infill	The material or structure used to fill the frame of a gate, which may include metal bars, mesh, or solid panels.

Term	Definition
Gate Operator	A motorised device that automates the movement of a gate.
Gate Stop	A physical barrier preventing a gate from over-traveling past the intended open and closed positions.
Hold-to-Run Operation	Mode requiring continuous button pressure and line of sight to move a gate, allowing immediate stop if hazards appear.
Hinge Guard	A protective cover preventing fingers from getting caught in the hinge area.
Hydraulic Operator	A gate motor powered by hydraulic pressure.
Impact Force	The force exerted by a moving gate when it makes contact with an object or person.
Intercom System	A communication device that allows remote gate access control.
Keypad Entry System	An access system requiring a PIN code for gate activation.
Lock-Out / Tag-Out (LOTO)	A safety procedure ensuring the gate remains off, preventing accidental operation, during maintenance.
Loop Detector	A sensor embedded in the ground to detect vehicle presence and trigger gate operation. Should not be used for safety control only access control.
Maintenance Schedule	A planned routine for inspecting and servicing automated gates.
Manual Gate	A non-motorised gate that is manually opened and closed.
Manual Release Mechanism	A feature that allows a motorised gate to be manually operated in case of power loss or breakdown.
Motor Housing	The protective enclosure for the gate motor and electronic components.
Obstacle Detection System	A system that identifies obstructions in the gate's path to prevent accidents.
Over-Travel Prevention	A mechanism preventing the gate from exceeding its designed movement range.
PCBU (Person Conducting a Business or Undertaking)	A legal entity with duties under WHS law to ensure safety of workers and others affected by their activities.
Pedestrian Gate	A gate designed primarily for foot traffic that vehicles cannot use.
Photoelectric Beams	A sensor using light beams to detect obstacles near the gate.
Pre-Operational Safety Test	A function that checks safety features before the gate is activated.
Presence Detection	Non-contact safety devices (e.g. beams, lasers) that stop or reverse a gate before contact occurs.
Pulse Operation (Non-Visual)	A single action starts automatic gate movement without line of sight (e.g. remote control). Needs extra safety measures.
Pulse Operation (Visual)	A single action starts automatic gate movement with the operator in clear view of the gate.
Push-to-Exit Button	Device allowing free exit without code or credential from the inside.
Remote Control	A handheld device used to operate an automatic gate wirelessly.
Residual Current Device (RCD)	A device that disconnects power if leakage current is detected, protecting against shock and fire.

Term	Definition
Residual Hazard	A hazard that remains after controls are applied (e.g. low-force gate contact). Must be documented and managed.
Reversing Sensor	A device that automatically stops or reverses a gate when an obstruction is detected.
Risk Assessment	The process of identifying and mitigating hazards related to gate operation.
Safety Beams	Infrared sensors that detect movement across a gate's path to prevent closing on an object.
Safety Distances	Minimum clearances to prevent crushing, shearing, or entrapment, as defined in AS 4024 (e.g. ≥500mm).
Self-Supporting Gate	A gate that does not rely on external bracing or tracks for stability.
Shear Hazard	The risk of injury from body parts being trapped between moving and fixed gate components.
Sliding Gate	A gate that moves horizontally along a track or cantilever system.
Solenoid Lock	An electromechanical device that locks the gate when activated.
Speed Control	A system that regulates the opening and closing speed of an automatic gate.
Structural Integrity	The ability of a gate and supports to withstand loads, wind, and misuse without failure.
Support Post	A structural component that holds a gate in place.
Surge Protection Device	A component preventing electrical damage from power surges.
Swing Gate	A gate that opens in a swinging motion, either inward or outward, on three hinges.
Tamper-Proof Fasteners	Security screws or bolts that prevent unauthorised disassembly.
Technical File	A record of design, compliance, risk assessment, test results, and manuals for a gate installation.
Time Delay Function	A programmable setting that introduces a delay before the gate starts moving.
Torque Sensor	A system detecting excessive force in a moving gate.
UPS (Uninterruptible Power Supply)	A system providing temporary power to the gate in case of mains failure.
Vehicle Access Gate	A gate designed to regulate vehicular entry and exit.
Warning Signage	Labels indicating safety precautions near the gate.
Weatherproof Enclosure	A protective casing for gate electronics to withstand outdoor conditions.
Wind Load Resistance	The ability of a gate to withstand high wind forces without structural failure.
Wireless Access Keypad	A keypad allowing access control without physical wiring.
Worm Gear Drive	A reduction gear system used in gate automation for controlled movement.

3. Legislative Requirements

3.1 Work Health and Safety (WHS) Act 2011

The Work Health and Safety Act 2011 (WHS Act) is a primary piece of legislation that outlines the general duties of care for the health and safety of workers and the public in workplaces. The Act covers provisions related to machinery, including automatic gates, ensuring that they are safe for use.

Key points under the WHS Act:

3.1.1 Primary Duty of Care

Under Australian legislation, an automatic gate is classified as a machine. The Work Health and Safety (WHS) Act 2011 imposes a **Primary Duty of Care** on a **Person Conducting a Business or Undertaking (PCBU)** to ensure the safety of everyone interacting with the gate, including staff, visitors, and the public. These obligations focus on managing risks associated with the gate's operation, maintenance, and potential hazards.

Here are some key requirements:

3.1.2 Risk Management (WHS Act, Section 17)

The PCBU must **eliminate or minimise risks** associated with the automatic gate's operation. Eliminate risks through design, any remaining risks should be mitigated through control measures. This includes:

- **Risk assessment** of potential hazards (e.g. entrapment, collision, or malfunction).
- **Implementing control measures**, such as physical barriers, warning signs, or safety sensors to detect nearby people and prevent accidents.

3.1.3 Safe Operation (WHS Act, Section 19)

The PCBU must ensure that the gate:

- Is designed to operate safely.
- **Operates safely**, with appropriate safety systems such as pressure-sensitive edges, photoelectric beams, and other safety sensors to prevent the gate from closing on a person or vehicle.
- **Is regularly maintained** to ensure proper functioning, with documented inspections to identify and repair any wear, damage, or malfunction that could pose safety risks. The amount of maintenance will be determined by the recommendations of the gate manufacturer or component manufacturers and/or the duty cycle of the gate.

3.1.4 Safe Use and Training (WHS Act, Section 19)

For staff and others interacting with the gate:

- The PCBU must ensure **workers, contractors, responsible operator of the gate are trained** to operate and manage the gate safely, particularly if it can be operated manually or in emergency scenarios.
- **Information and instructions** regarding the safe operation of the gate must be clearly communicated to workers and visitors.

3.1.5 Emergency Procedures (WHS Act, Section 19)

The PCBU must implement emergency procedures for:

- **Manual override systems** to open the gate in case of power failure or malfunction.
- Proper **signage and instructions** visible to the public, guiding them in the event of a malfunction or hazard.

3.2 WHS Regulations 2011

The **Work Health and Safety Regulations 2011** outline specific requirements regarding machinery safety, focusing on the installation, operation, and maintenance of equipment like automated gates.

Relevant sections include:

3.2.1 Risk Management (WHS Regulation 34-38)

A risk management process must be followed to ensure the safety of workers and other persons interacting with the automatic gate.

This includes:

- **Identifying hazards:** Assess the gate for potential risks, such as crushing, entrapment, electrical hazards, and mechanical failure.
- **Risk Assessment:** Evaluate the likelihood and severity of harm that could result from identified hazards.
- **Risk Control:** Implement controls to eliminate or minimise risks, utilise non-contact safety as a first measure, with reliance on contact safety as a secondary control: such as sensors, pressure-sensitive edges, and guards.
- **Review and Monitor Controls:** Regularly review safety controls to ensure they are effective and updated as needed.

3.2.2 Guarding and Protective Devices (WHS Regulation 208 & 214)

Automatic gates should be fitted with appropriate guarding and protective devices to prevent access to hazardous moving parts (e.g. sliding tracks, motor mechanisms, and gears). The guarding should:

- Be designed to prevent contact with dangerous parts.
- Remain in place during normal operation of the gate.
- Be robust enough to withstand forces and conditions during operation.
- Not be subject to risk of single point failure.

Specific protective measures could include:

- **Safety sensors:** Laser, photoelectric beams or ultrasonic sensors to detect objects or people in the gate's path.
- **Physical barriers:** Guards to prevent access to motor mechanisms and dangerous pinch points.
- **Safety edges:** Pressure-sensitive safety edges that stop gate movement upon contact.

3.2.3 Control Measures for Crushing and Entrapment Hazards (WHS Regulation 215)

Due to the size and power of automatic gates, there is a significant risk of crushing or entrapment. Specific control measures must be implemented to mitigate these risks, such as:

- **Reversing mechanisms:** Gates should have a controlling system that enables a reverse or halt movement in the correct phase of operation if an obstruction is detected, such as a vehicle or person.
- **Force limits:** The force exerted by the gate during operation should be limited to reduce serious injury from accidental contact. Force should be set as low as possible for reliable operation.

3.2.4 Maintenance, Inspection, and Testing (WHS Regulation 213 & 221)

Machinery, including automatic gates, must be regularly inspected, maintained, and tested to ensure they remain safe to use. Specific requirements include:

- **Regular inspections:** Conduct regular checks for wear and tear, electrical integrity, and the functioning of safety devices (e.g. sensors, stop buttons).
- **Maintenance schedules:** Follow a set maintenance plan, typically recommended by the manufacturer, to ensure the long-term reliability of the physical gate and any automation equipment. Maintenance service frequency should only be stipulated by the installer / manufacturer to ensure continued safe use; owner cannot dictate when it should be serviced.
- **Testing of safety features:** Ensure safety mechanisms like photoelectric beams, emergency devices, and reversing systems are tested periodically to ensure they function as intended. All safety devices should fail safe i.e. the gate will not operate if a safety device has failed.

3.2.5 Installation and Commissioning (WHS Regulation 222)

A competent person must install and commission the automatic gate to ensure compliance with both the safety regulations and the manufacturer's installation instructions. Key points include:

- **Competent personnel:** Installation should only be done by someone competent in gate automation systems, particularly in compliance with electrical safety and machinery standards.
- **Testing after installation:** The gate must be tested after installation to ensure that all safety features and protective measures work correctly before it is put into operation.

3.2.6 Safe Operating Procedures (WHS Regulation 39)

Develop and provide safe operating procedures for users and operators of the automatic gate.

These should cover:

- Proper usage and control of the gate (e.g. opening and closing procedures).
- Emergency protocols in case of malfunction or accident.
- Maintenance procedures and checks that need to be followed regularly.
- Operator training to ensure safe usage of the gate and hazard recognition.
- Consideration to placement of operation devices should be undertaken to ensure that the system can be operated safely and not place the user in harm's way.

3.2.7 Signage and Warnings (WHS Regulation 226)

Appropriate warning signs should be placed near automatic gates to inform users of potential hazards and safe operating practices. This could include:

- **Safety warnings:** Signs alerting to moving parts and potential crushing or entrapment risks.
- **Instructions for emergencies**.

3.2.8 Electrical Safety (WHS Regulation 149 & 150)

As automatic gates are powered by electricity, they must comply with electrical safety regulations. Specific requirements include:

- Electrical isolation: The gate must have a safe way to isolate it from electrical power for maintenance or in case of an emergency.
- Protection against electrocution: Ensure electrical components are adequately insulated, earthed, and shielded from moisture or physical damage.
- Residual Current Devices (RCDs): Use of RCDs to cut off electrical supply in case of an electrical fault.

3.3 Australian Standards

Several Australian Standards apply to gate automation systems and machinery safety. These standards provide technical specifications and best practices for the design, installation, and operation of automated gates and related equipment.

Some relevant standards:

AS/NZS 60335.2.103:2016 establishes the fundamental safety obligations for electric drives used to operate gates, doors, and similar barriers in domestic, commercial, and light-industrial settings. The standard extends the general requirements of AS/NZS 60335.1, focusing on hazards introduced by the moving structure itself.

Clause 1 - Scope and Application

This section defines the standard's coverage: electrically driven mechanisms that move gates, garage doors, doors, or windows in residential, commercial, or light-industrial settings. It applies to drives powered by AC or DC voltages up to 250V for single-phase and 480V for others. It excludes industrial machinery, lifts, and gates specifically designed for vehicles within secure compounds.

Application to gates:

All powered sliding, swing, or overhead gates for commercial and multi-residential use fall within this scope. If the gate is intended for public or frequent pedestrian use, the full safety provisions of this standard must be applied, not just electrical compliance.

Clause 20 - Stability and Mechanical Hazards

This clause modifies the general stability and mechanical hazard provisions from AS/NZS 60335.1. Drives must be designed so that failure of a component cannot result in collapse or uncontrolled movement of the gate. During operation, the system must limit the mechanical forces transmitted to the moving part to levels that do not endanger people or property.

Practical implications:

- Gates must not move with uncontrolled force if power is lost or the drive disengages.
- Any moving gate leaf must include physical stops, limit switches, or mechanical limits to prevent over-travel.
- Drive gearing or arms must not shear, crush, or trap body parts during motion.
- If a gate can move vertically, provisions must exist to prevent it from dropping under its own weight.

Clause 22 - Construction and Manual Operation

This section introduces the requirement for **manual release mechanisms** and defines how these must operate safely. The drive must allow the gate to be moved by hand in the event of power failure or emergency. The release must be accessible, not located within a crush zone, and should not require special tools or force.

For gate automation:

- Manual release levers must be operable without risk of sudden movement.
- The mechanism must default to a safe, locked state when re-engaged.
- The drive must not automatically restart after power restoration without a deliberate user action.

Clause 101 - Additional Gate Drive Requirements

This is the heart of the gate-specific section of the standard. It introduces control and detection features for **obstruction sensing, force limitation**, and **automated stopping or reversal**. The drive must sense when the gate meets resistance greater than a defined safe limit and must stop or reverse immediately.

Gate-specific expectations:

- Force limitation devices or current-sensing logic must prevent crushing and shearing hazards.
- Safety edges or non-contact sensors (e.g. photocells) must be incorporated where people or vehicles may be present.
- The safety system must function even when the drive operates under reduced voltage or partial failure.
- System logic should prevent multiple command inputs causing conflicting movements.

3.3.1 AS 4024.1 - Safety of Machinery

One of the most important machinery safety standards in Australia is AS4024.1. Although compliance is not mandatory, it does represent an excellent defence in case of an action relating to neglect of duty of care. Conversely, non-compliance can lead to significant legal consequences under the WHS Act.

Key points of AS 4024.1 - Safety of Machinery are:

Risk Assessment (AS 4024.1201)

- A fundamental requirement of **AS 4024.1** is performing a **risk assessment** to identify hazards and apply appropriate risk reduction measures. The risk assessment process involves the following steps:
  - **Identifying hazards:** Evaluate the gate for potential hazards.
  - **Risk analysis:** Assess the severity and likelihood of potential harm caused by the identified hazards.
  - **Risk reduction:** Implement safety measures and design changes to eliminate or minimise the risks.
- For automatic gates, this would include evaluating risks when the gate is operating.

Design Principles for Safety (AS 4024.1201 & 4024.1301)

- AS 4024.1 emphasises designing machinery (including automatic gates) with inherent safety, reducing risks at the design stage before adding external safeguards.

Key design requirements include:

- **Fail-safe* operation:** the gate automation system should be configured to revert the gate to a safe state in the event of failure (e.g. the gate stops or opens in case of power failure or mechanical malfunction.
- **Fail-secure* operation:** For sites requiring maximum security, the gate automation system can be configured to operate in a fail-secure mode. This means that in the event of a power failure, the gate will automatically close or remain closed to maintain security. *The decision to use a fail-safe or fail-secure configuration should be made during the design phase and in consultation with the site owner. This choice must be clearly documented and formally approved by the site owner.
- **Minimisation of hazards:** The design must minimise hazards.
- **Ergonomic considerations:** The gate controls and access points should be designed to ensure Safe operation.

Guarding of Hazardous Parts (AS 4024.1601 & 4024.1602)

- Automatic gates, as machinery, should have guarding or protective devices to prevent access to dangerous moving parts that could cause harm. This should be considered as part of a general machine risk assessment.

Protective Measures for Crushing, Shearing, and Entrapment (AS 4024.1701 & 4024.1702)

- Automatic gates must have protective measures to avoid injury from crushing, shearing, or entrapment during operation.
- Examples of required measures include:
  - **Obstacle detection systems:** devices that detect persons or objects in the gate's path and stop or reverse its movement.
  - **Force limitation:** Gates should have mechanisms that can control the force applied during movement to prevent serious injury.

Operator Controls and Access (AS 4024.1201)

- The design of operator controls for automatic gates must consider the ease of use, safety, and prevention of unintended operation.
- Key control requirements include:
  - **Position of controls:** The control panel or remote devices should be positioned at a safe distance from the gate to avoid placing the operator in harm's way.
  - **Lock-out and tag-out:** If maintenance is required, the system should have lock-out/tag-out procedures to ensure the gate remains in a safe, de-energised state during service.

Signage and User Information (AS 4024.1901)

- Automatic gates should be equipped with **clear signage and warning labels** to inform operators and bystanders of potential hazards.

Maintenance, Inspection, and Testing (AS 4024.1202 & 4024.1601)

- **Regular maintenance and inspection** of automatic gates are required to ensure ongoing safety and compliance with standards. AS 4024.1202 outlines the need for:
- **Routine inspections:** Regularly inspect the gate system, for wear, damage, or malfunction.
- **Environmental Considerations (AS 4024.1101).**
- The environmental conditions in which the automatic gate operates must be considered.

3.3.2 AS/NZS 3000 - Electrical Installations (Wiring Rules)

Covers the installation of electrical systems. Any power fed to any automatic gate must meet the requirements of this standard.

Any Electrical work that has 240v power or greater must be completed by a licenced electrician.

3.3.3 Civil Liability

In addition to regulatory compliance, failure to fulfil duty of care can lead to civil liability under negligence laws. If someone is injured due to improper installation, operation, or maintenance of automated gates, the responsible party may face legal action.

3.3.4 Electrical Safety Act

Automated gates often have integrated electrical systems, and compliance with the **Electrical Safety Act 2002** is crucial. The Act includes provisions to ensure the safe installation and operation of electrical machinery, aiming to prevent electrocution and other electrical hazards.

3.3.5 AS 1170 - Structural Design Actions

AS 1170 is a series of Australian standards addressing structural design actions.

The key components include:

- **AS 1170.1:2011 - Structural Design Actions, Part 1: Permanent, Live, and Other Actions:** Offers guidelines on loads to consider in structural design, such as wind loads and environmental factors, to ensure that gate structures can withstand various forces."
- **AS 1170.2:2011 - Structural Design Actions, Part 2: Wind Actions:** Specifies wind load requirements, helping determine the wind pressure the gate and its supporting structure must be designed to resist, ensuring stability under varying wind conditions.

Application to Gates:

1. **Design Load Calculation:** When designing self-supporting gate structures, AS 1170 standards help calculate the appropriate load-bearing capacity, including environmental factors such as wind.
2. **Foundation and Stability:** Proper design according to AS 1170 ensures that the gate's foundation and supporting structures are robust, reducing the risk of tipping or collapse.

3.3.6 AS 4100 - Steel Structures

AS 4100:1998 - Steel Structures provides guidelines for the design of steel structures, including gates with steel components.

Application to Gates: Ensures that steel gates and supporting structures are engineered to handle anticipated loads, including self-weight and external forces such as wind and impact.

3.3.7 Australian Construction Codes and Standards

National Construction Code (NCC), formerly known as the Building Code of Australia (BCA): Although not specific to gates, the NCC includes general structural integrity and safety requirements applicable to all building structures, including gates.

Application to Gates: Ensures gate installations comply with overall building safety standards, covering stability and load-bearing capacities, egress, access and fire regulations will apply depending on the building class.

3.3.8 Local Regulations and Codes

Local Council Regulations: It is essential to consult local councils for any additional requirements or regulations specific to gate installations. These may include special guidelines for design parameters, self-supporting structures or extra safety measures

4. Hazard Identification

4.1 General

The regulations that are applicable to gates and automation advise that hazards need to be identified, assessed and controlled.

Controls may include safe gate design, force limitation, safety sensors, signage, and regular maintenance. By integrating these risk management principles, PCBU's can enhance safety, meet legal requirements, and reduce liability, ensuring automatic gates operate without posing undue risks to users or nearby personnel.

4.2 Gate Specific Hazard Identification, Control and Compliance

All gates and barriers, whether manual or automated, present potential hazards that can cause harm if not adequately managed. These hazards can be generic, affecting all installations, or specific to a particular site or installation type.

Effective hazard identification is a fundamental step in ensuring the safety and regulatory compliance of gate and barrier installations. It involves a thorough assessment of the risks associated with the gate's operation, including factors such as user interaction, environmental influences, and mechanical or electrical malfunctions.

Hazards must be evaluated considering both the intended use and foreseeable misuse of the gate or barrier installation. This assessment guides the design and implementation of appropriate safety measures aimed at minimising risks. For example, foreseeable misuse might include the gate being operated while someone is in its path, or unauthorised access by children.

Installations should be designed to eliminate or reduce hazards through inherently safe design wherever possible.

4.3 General Gate Hazards

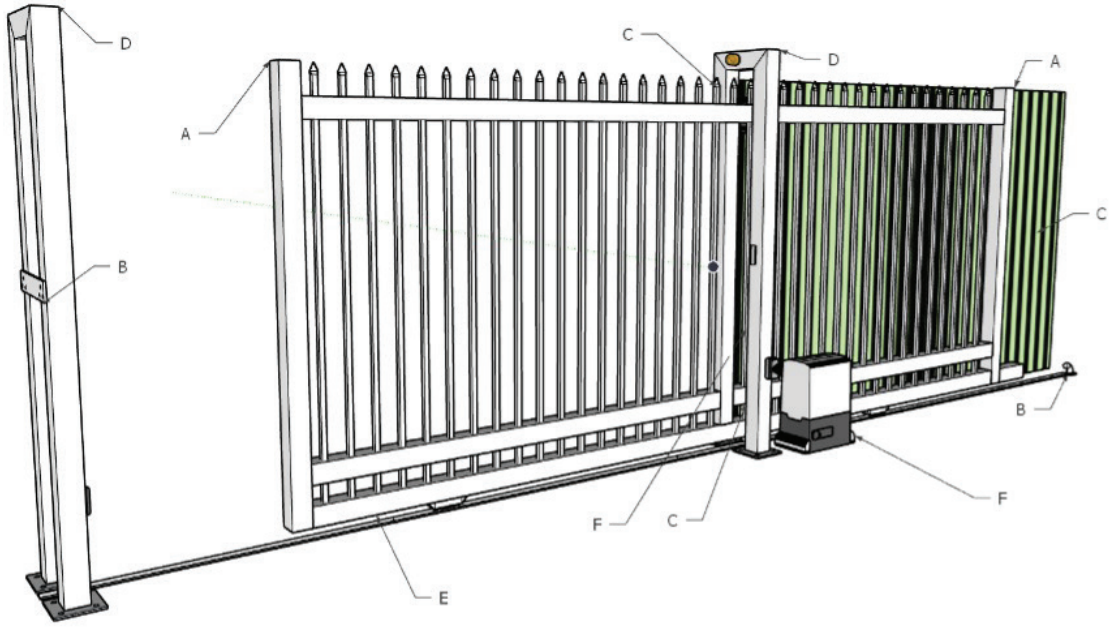
Hazard	Description
Structural and Foundation Failure (Structural Integrity)	Risk of the structure failing, leading to potential collapse.
Fixing Failures (Structural Integrity)	Failures in the fixings that can lead to detachment or failure of components.
Wind Load Failure (Structural Integrity)	Damage caused by wind exerting pressure or force against gate and barrier structures, potentially leading to structural failure.
Electric Shock/Fire (Electrical Safety)	Risks associated with electrical faults that can lead to shock or fire hazards.
Control System Failure (Control System Integrity)	Failure of safety systems designed to control gate and barrier operations, leading to uncontrolled or unintended movements or operations.

4.4 Specific Hazards by Movement and Mechanism

Hazard	Description
Crush (Safety Distances, Guards and Enclosures)	Where parts of the gate or barrier can compress against a body during operation.
Shear and Draw-In Hazards (Safety Distances, Guards and Enclosures)	Occur at moving parts where body parts can be drawn in or compressed in a cutting motion against both static and moving objects, such as at gaps between sliding gates and their supports.
Impact Hazards (Safety Distances, Guards and Enclosures)	Caused by the horizontal movement that can push against a body without compressing it.
Hooking Hazards (Safety Distances, Guards and Enclosures)	Caused by the capture of limb, worn objects or articles by the moving gate and directing towards or acting as a hazard.
Entrapment (Safety Distances, Guards and Enclosures)	Risks where individuals could be trapped due to faults in the gate or barrier installation.
Derailment (Structural Integrity)	Displacement or falling off of gates from their designated tracks or guides.
Reducing Gaps (Safety Distances, Guards and Enclosures)	Risk of crush injuries from vertically or horizontally moving parts.
Uncontrolled Movement	Where a gate leaf moves in an uncontrolled manner irrespective of manual or automated operation. Risk of structural failure, injury to personnel or property.

4.5 Sliding Gate Hazards

Sliding gates are defined by their movement parallel to a fence or wall line, operated either manually or automatically with various mechanical configurations as described below.



Present Dangers On Installation		Sliding Gate			
A	**y/n:**	Impact also crushing when against the stop post, crushing is worse here than impact	**D**	**y/n:**	Support failure
B	**y/n:**	Gate travel overrun	**E**	**y/n:**	Dragging, hooking
C	**y/n:**	Shear, entanglement also at the shutting post	**F**	**y/n:**	Entanglement, crush

Sliding gates, like any mechanical installation, come with inherent risks that must be properly managed to ensure safety and compliance. Common hazards associated with sliding gates and the minimum safety standards to mitigate these risks are detailed below:

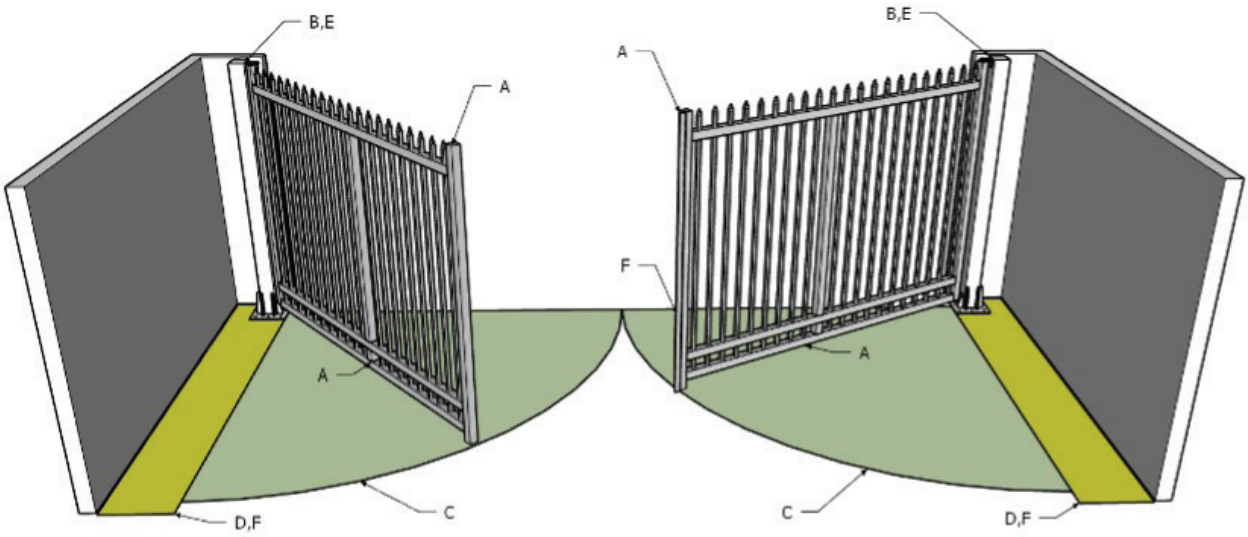
	Hazard	Suggested Level of Safety
1	Structural Failure - Supporting Structures	Ensure all supporting structures provide robust structural integrity of the installation in fully open and fully closed positions and all states between.
2	Structural Failure - Leaf	Ensure the gate leaf maintains its structural integrity under operational stresses. Ensure more than one support post / point for sliding gates or anti fall devices are fitted.
3	Structural Failure - Guides, Rolling Gear & Travel Stops	Components such as guides and rolling gear must be designed and maintained to withstand the loads and usage frequency without failure. Where gates are on inclines, additional consideration must be provided through an appropriate risk assessment.
4	Crush - Reducing Gap	Safety Distance: Set minimum clearances to prevent human access to hazardous gaps where the gap becomes less than 500mm (Open/Close).
5	Shear & Draw-in - At the Supports, Drive or Other Fixed Objects	Isolation / Exclusion: Isolate / Exclude potentially hazardous components to prevent user contact. E.g. Mesh cladding the gate or adjacent objects. Non-contact SAFETY DEVICE first contact SAFETY DEVICE second.
6	Crush - At Guide Rollers	Implement enclosures and non-contact safety features to prevent access to guide rollers during gate operation. Mechanical covers around rollers are a better option than electronics.
7	Shear - Through Perimeter Fence	Enclosures / isolation and detection systems to prevent body parts from entering shear points along the perimeter fence.
8	Impact - Operational Area of Gate	Enclosure/Isolate the run back area of the Operational Zone to prevent accidental entry. Force Limitation: Control measures to stop the gate if an object is detected within the impact zone. Non-contact Presence Detection: Utilises sensors to detect objects and stop the gate movement to prevent contact. Contact Presence Detection: Utilises sensors to detect objects and stop or stop and reverse the gate upon contact.

It is imperative that these hazards are identified during risk assessments and controlled as outlined to ensure the safe operation of sliding gates.

4.6 Swing Gate Hazards

Swing gates are commonly used for both vehicular and pedestrian access and come with their own set of operational and safety challenges, operated either manually or automatically with various mechanical configurations as described below.

This section outlines the specific hazards associated with swing gates and the suggested safety measures to mitigate these risks. Common hazards associated with swing gates and the minimum safety standards to mitigate these risks are detailed below:



Present Dangers On Installation		Swing Gate			
A	**y/n:**	Impact and crushing here, needs to be A & F	**D**	**y/n:**	Entrapment
B	**y/n:**	Travel stops overrun	**E**	**y/n:**	Leaf support failure
C	**y/n:**	Dragging, hooking	**F**	**y/n:**	Crush

Present Dangers On Installation		Bi-Folding Swing			
A	**y/n:**	Impact also a crush risk so A&D as well as when the 2 leaves come together	**D**	**y/n:**	Crush
B	**y/n:**	Support failure, overrun	**E**	**y/n:**	Dragging, hooking
C	**y/n:**	Shear, entanglement	**F**	**y/n:**	Entanglement

	Hazard	Suggested Level of Safety
1	Structural Failure - Leaf	Ensure the gate leaf maintains its structural integrity under operational stresses.
2	Structural Failure - Hinges, Fixings & Travel Stops	Components must be designed and maintained to withstand the loads and usage frequency without failure and to prevent malfunction or collapse. Single point failure considerations need to be undertaken with respect to the hinge or an anti-fall device.
3	Structural Failure - Wind Load	Design and install gates to withstand local wind load specifications to prevent structural failures due to high winds.
4	Crush - Areas that have Less Than 500mm (Open/ Close)	Design Safety Distance: Set minimum clearances (500mm) to prevent human access to hazardous gaps. Force Limitation: Limits the force exerted by the moving gate to safe levels (Mitigation of hazard Can't be done through force limitation alone). Non-contact Presence Detection: Utilises sensors to detect objects and stop and reverse the gate movement to prevent contact. Contact Presence Detection: Utilises sensors to detect objects and stop or stop and reverse the gate upon contact.
5	Crush - Hinge Area	Safety Distance: Set minimum clearances to prevent human access to hazardous gaps (Conduct risk assessments to address site specific gates that have high risks). Flexible Guards: Where it cannot be designed out or likelihood of vulnerable user interaction is present. Non-contact Presence Detection: Utilises sensors to detect objects and stop the gate movement to prevent contact. Contact Presence Detection: Utilises sensors to detect objects and stop or stop and reverse the gate upon contact.
6	Crush - Under Gate	Safety Distance: Set minimum clearances to prevent human access to hazardous gaps. Force Limitation: Limits the force exerted by the moving gate to safe levels (Mitigation of hazard can't be done through force limitation alone). Force Limitation: Limits the force exerted by the moving gate to safe levels. Can't be done through force limitation alone, will always require safety edges to protect the drawing in risk below. Non-contact Presence Detection: Utilises sensors to detect objects and stop the gate movement to prevent contact.
7	Impact - Swept Area	Force Limitation: Limits the force exerted by the moving gate to safe levels. Can't be done through force limitation alone, will always require safety edges to protect the drawing in risk below. Non-contact Presence Detection: Utilises sensors to detect objects and stop the gate movement to prevent contact.
8	Shear / Crush / Hooking from operator	Design, selection and location of operator to consider the least amount of risk to people or property when operating. E.g. Cranked arm operator risks in public spaces - complete risk assessment to an appropriate height to reduce risk.

5. Hazard Controls

Managing hazards involves implementing control measures that are considered “reasonably practicable” to ensure safety.

This term signifies a balance between the severity of harm and the feasibility of the precautions that can be taken.

Below are the primary strategies to control hazards in the design and operation of gates:

Safe Design

- Structural Integrity
- Electrical Safety
- Control System Integrity
- Safety Distances, Guards and Enclosures
- Visual and Audible Controls
- User Exposure and Vulnerability
- Slope and Gradient Controls (Sliding Gates)
- Manual Operation
- Automatic Operation

Non-Contact (Presence Detection)

- Incorporate sensors and presence detectors to automatically stop or reverse the gates when an obstruction is detected to prevent contact and potential injury.

Safe Contact

- Use technology that limits the force exerted by moving parts to safe levels to prevent injury upon accidental contact.

Installations should be designed to eliminate or reduce hazards by safe design wherever possible, rather than use sensitive devices to control hazards created by the design.

Hazards that cannot be eliminated or reduced by safe design should be controlled by one or a combination of the remaining two primary strategies.

- Non-Contact (Presence Detection)
- Safe Contact

Hazard controls must be put in place for hazards presented during intended-use and foreseeable-misuse hazards.

5.1 Structural Integrity Controls

General Requirements:

All gates shall be designed, fabricated, and installed to ensure adequate structural integrity for the intended purpose, environment, and duty cycle. The design must consider loads, forces, and stresses encountered during operation, as well as foreseeable misuse and environmental factors. Structural components shall resist deformation, failure, or instability that could compromise safe operation.

Hazards May Arise Where:

- Gates are not designed to withstand expected operational and environmental forces (e.g. wind loading, flooding, or impact loading).
- Infill or panel materials are inadequately secured, leading to detachment or collapse.
- Posts, supports, or foundations are undersized, poorly constructed, or installed on unsuitable ground conditions.
- Welds, fixings, or fasteners are insufficient or improperly applied, resulting in structural weakness.
- Gate frames distort under load, causing binding, derailment, or misalignment.
- Components deteriorate prematurely due to corrosion, fatigue, UV degradation, or material failure.

Design and Compliance:

Control measures shall ensure that the structural integrity of the gate system is suitable for its intended use, environmental conditions, and compliant with relevant standards. Measures shall include:

- Designing gate structures to withstand operational forces, wind loads, and foreseeable environmental stresses.
- Selecting materials and finishes appropriate for the environment, including corrosion protection and UV resistance where required.
- Ensuring gate posts, footings, and support structures are adequately sized and constructed for the applied loads and ground conditions.
- Fabricating frames and components to resist distortion, warping, or misalignment under operational or environmental loads.
- Providing secure fixing of infill panels and ensuring all welds, fasteners, and joints are designed and installed to maintain structural integrity throughout the service life of the gate.
- Conducting inspection and verification during installation to confirm correct fabrication, alignment, stability, and environmental resilience.
- Documenting structural design assumptions, including load considerations and material specifications, within the installation file.

5.2 Electrical Safety

General Requirements:

Electrical installations associated with automatic gates shall be designed, installed, and maintained in accordance with relevant electrical standards and WHS legislation. Systems must ensure safe operation under both normal and fault conditions, with adequate provisions for isolation, protection, and prevention of electric shock.

Hazards May Arise Where:

- Live parts are exposed or inadequately insulated.
- Protective devices (e.g. circuit breakers, RCDs) are absent, incorrectly rated, or bypassed.
- Cabling is undersized, incorrectly routed, or inadequately protected.
- Earthing and bonding are insufficient or absent.
- Moisture ingress compromises electrical enclosures or components.
- Isolation facilities are not provided or are inaccessible during servicing.
- Electrical equipment is installed in unsuitable environments, leading to overheating, corrosion, or premature failure.

Design and Compliance:

Control measures shall ensure electrical safety is achieved throughout the lifecycle of the installation. Measures shall include:

- Designing and installing electrical systems in compliance with AS/NZS 3000 and other relevant standards.
- Providing protective devices (e.g. circuit breakers, RCDs) correctly rated for the load and site environment.
- Ensuring all cabling is correctly sized, mechanically protected, and segregated from incompatible services.
- Providing effective earthing and equipotential bonding of all exposed conductive parts.
- Installing weatherproof or IP-rated enclosures and components appropriate to the environment.
- Ensuring a local isolator is provided to disconnect all sources of supply to the gate, positioned in a readily accessible and clearly identified location.
- Ensuring that all low-voltage electrical work is carried out by a qualified electrician, in accordance with legislative requirements.
- Ensuring that enclosures containing exposed voltages of 50V AC or 120V DC and above are appropriately labelled and only accessible by means of a key, tool, or other deliberate means of access.
- Providing safe isolation procedures and facilities for installations with multiple sources of supply (e.g. mains and solar, or mains and UPS) to prevent back feed and unintended energisation.
- Considering potential single point failures in electrical design, ensuring redundancy or protective measures are applied where necessary to maintain safety.
- Conducting electrical inspection, testing, and commissioning to verify compliance prior to handover.

5.3 Control System Integrity

General Requirements:

Control systems for automatic gates shall be designed, installed, and maintained to ensure safe, predictable, and reliable operation under all reasonably foreseeable circumstances. Control logic, inputs, and outputs must not permit unsafe conditions, and the system must fail to a safe state in the event of malfunction or power loss.

Hazards May Arise Where:

- Control systems fail to detect obstructions or hazards.
- Logic circuits or software allow conflicting or unsafe commands.
- Control inputs (e.g. remotes, keypads, sensors) are positioned in hazardous locations.
- Power supply interruptions result in uncontrolled restarts.
- Override or emergency functions are absent, inaccessible, or unreliable.
- A single component failure leads directly to unsafe operation without protective redundancy.

Design and Compliance:

Control measures shall ensure that control system integrity is maintained throughout the lifecycle of the installation. Measures shall include:

- Designing control systems with appropriate redundancy and fault detection to prevent unsafe operation.
- Ensuring that all safety inputs are continuously monitored and default to a safe state upon failure.
- Positioning user controls and access devices outside of gate travel paths and hazard zones.
- Preventing uncontrolled restart following power interruption or restoration unless safe conditions are confirmed.
- Incorporating logic to prevent conflicting or simultaneous unsafe commands.
- Designing control systems to avoid single point failures, ensuring no single fault can result in loss of safety functions.
- Commissioning and testing all safety and control functions prior to handover to verify compliance with design intent.
- Documenting control system design, logic, settings, and safety provisions within the installation file for future reference.

5.4 Safety Distances, Guards and Enclosures

General Requirements:

Automatic gates shall be designed and installed so that moving parts do not present entrapment, crushing, or shearing hazards to users. Safety distances, guarding, and enclosures must comply with relevant standards, ensuring hazardous areas are inaccessible during operation.

Hazards May Arise Where:

- Moving parts such as rollers, hinges, or drive systems are exposed and accessible.
- Openings in gate infill, fencing, or guarding permit fingers, hands, or limbs to become trapped.
- Safety distances between the moving gate and fixed structures are inadequate.
- Shear, crush, or draw-in zones exist at posts, receivers, or structural interfaces.
- Guards or enclosures are absent, poorly designed, or easily removed without tools.
- Access control devices are positioned so that users are within hazardous areas while operating the gate.
- A single failure of a guard, infill, or barrier results in immediate exposure to hazardous moving parts.

Design and Compliance:

Control measures shall ensure that safety distances, guards, and enclosures are designed to eliminate or control physical hazards. Measures shall include:

- Providing fixed guards or enclosures around hazardous moving parts, such as drive units, rollers, hinges, and pinch points.
- Ensuring clearances between moving gates and fixed structures are designed to prevent entrapment.
- Designing gate infill and fence structures so that gaps do not exceed 100mm, in accordance with industry safe design principles.
- Eliminating or guarding shear and draw-in points at posts, receivers, and structural interfaces.
- Using materials and guarding systems that are durable, tamper-resistant, and not easily removed without a tool.
- Positioning access control devices (e.g. keypads, card readers, intercoms) so users cannot operate the gate while standing in a hazard zone.
- Considering potential single point failures of guarding systems, ensuring no single failure can expose users to hazardous movement.
- Verifying safety distances, guard effectiveness, and enclosure design during commissioning.
- Documenting compliance with clearance requirements, guard specifications, and enclosure design within the installation file.

Height Considerations:

Ensure hazards associated with moving parts are controlled or eliminated up to a height of 2.0m from ground level or any permanent access level (e.g. stairs, mezzanines, platforms).

Hazards above 2.0m that are not reachable without additional means do not require further control measures.

Guarding and Protection Measures:

Provide fixed guards or enclosures around hazardous moving parts, including drive units, rollers, hinges, and pinch points.

Enclosures should be designed and constructed to prevent body parts from accessing danger points, considering reach-through, reach-over, and reach-around hazards.

Guards shall be durable, tamper-resistant, and not removable without the use of a tool. The distance from the gate to the fence/guard should be protected by the size of the mesh below:

Distance Between Enclosure and Gate	Size of Mesh
120mm	18.5mm or less
300mm	18.5mm – 29mm
500mm	29mm – 44mm
850mm	44mm – 100mm

Hinge Area Controls:

Hinge areas shall be designed to create a constant gap that does not exceed 8mm, or that does not reduce to less than 25mm during movement.

Where the overall hinge gap is less than 100mm, ensure that the reducing gap is not more than 20% of the total gap.

Where a safe hinge design cannot be achieved, provide flexible guards that:

- Are durable and cover the entire hazard area.
- Do not fold into the reducing gap during movement.
- Can only be removed by means of a tool or key for maintenance and inspection.

Reducing Gaps:

The maximum gap in any gate system shall not exceed 100mm.

Gaps must not reduce by more than 20% of their size, and shall not reduce to less than 25mm.

Where the reduction exceeds 20%, additional protective measures such as safety edges or finger-trap guards shall be fitted.

Original Gap	20% Reduction	Minimum Gap
100mm	20mm	80mm
90mm	18mm	72mm
80mm	16mm	64mm
70mm	14mm	56mm
60mm	12mm	48mm
50mm	10mm	40mm
40mm	8mm	32mm
30mm	6mm	25mm

5.5 Slope and Gradient Controls (Sliding Gates)

General Requirements:

Sliding gates shall be designed and installed on level ground wherever reasonably practicable. The preferred control measure is to eliminate slopes for sliding gates at the civil and site design stage. Where slopes cannot be avoided, gates must be designed, fabricated, and installed to ensure safe and controlled operation under all reasonably foreseeable conditions. The additional forces imposed by gravity, run-back potential, and uneven load distribution must be considered in both design and installation.

Hazards May Arise Where:

- Gravity causes uncontrolled run-back of the gate when disengaged from the operator.
- Operators or drive units are undersized and unable to overcome additional loads imposed by the slope.
- Track or support systems wear prematurely due to uneven or excessive loading.
- Manual release in a power failure results in sudden, uncontrolled gate movement.
- Inadequate stops, anchoring, or braking systems allow the gate to roll downhill.
- A single point failure (e.g. wheel, carriage, or track failure) results in catastrophic gate movement on a slope.

Design and Compliance:

Control measures shall ensure that sliding gates on slopes are designed and installed to eliminate or minimise risks associated with run-back and uneven loading. Measures shall include:

- Prioritising civil and site design solutions that remove slopes altogether for sliding gate installations, ensuring gates are installed on level ground wherever reasonably practicable.
- Designing gate systems to account for the additional forces generated by sloping ground, including uphill and downhill forces, where slopes cannot be avoided.
- Ensuring operators are correctly rated for the slope and increased load demands.
- Providing radial dampers or mechanical brakes to prevent uncontrolled downhill movement when the gate is released or in the event of operator failure.
- Ensuring manual release mechanisms are designed to safely control gate movement on slopes.
- Installing robust end stops and anchoring systems to prevent the gate leaving the track or support system.
- Designing out single point failures by ensuring no single wheel, carriage, or track component failure can result in uncontrolled gate movement.
- Verifying during commissioning that the gate can operate safely and reliably under full load on the slope.

5.6 User Exposure and Vulnerability

General Requirements:

Ensure consideration is given to the exposure and vulnerability of the persons who may interact with the installation. Not all users will have the same level of awareness, strength, mobility, or familiarity with the system.

Hazards May Arise Where:

- Children are present and may attempt to play on or near the gate.
- Elderly persons interact with the gate and have reduced mobility or slower reaction times.
- Persons with disabilities are present, including those with limited strength, vision, or cognition.
- Members of the public, visitors, or contractors who are unfamiliar with the gate are required to operate it.

Compatibility and Conformance:

Control measures shall ensure that the installation is compatible with the needs of all foreseeable users and conforms to relevant safety requirements. Measures shall include:

- Designing gates and controls to minimise the risk of entrapment, crushing, or shearing, regardless of user capability.
- Installing clear and visible signage indicating the presence and operation of automatic gates.
- Providing suitable safety devices such as photoelectric beams, pressure-sensitive edges, and emergency stop functions.
- Ensuring manual release mechanisms are simple to operate and do not require excessive force.
- Positioning access control devices (e.g. keypads, card readers, intercoms) at safe distances to prevent users from standing within hazardous areas.
- Conducting a user-focused risk assessment to identify site-specific vulnerabilities and implementing additional protective measures where required.
- Designing facilities so that pedestrian entry and exit points are provided separately from vehicle gates, thereby reducing the likelihood of pedestrian-vehicle conflicts and exposure to gate movement hazards.

5.7 Manual Operation

General Requirements:

Automatic and manual gates shall be designed and installed so that they can be safely operated in manual mode under all reasonably foreseeable circumstances, including power failure, emergency situations, or maintenance activities. Manual operation must not expose users to undue risk of injury.

Hazards May Arise Where:

- The gate is excessively heavy or unbalanced, requiring significant force to move.
- The manual release mechanism is difficult to locate, access, or operate.
- The gate moves uncontrollably when disengaged from the operator.
- Users are required to enter hazardous areas to manually release or operate the gate.
- Sharp edges, protrusions, or pinch points are present on manual handles or contact points.

Compatibility and Conformance:

Control measures shall ensure that manual operation is safe, reliable, and compatible with the needs of all foreseeable users. Measures shall include:

- Providing a manual release mechanism that is readily accessible, identifiable, and simple to operate.
- Ensuring that gates are balanced and able to be moved with reasonable force when in manual mode.
- Incorporating features (e.g. mechanical stops, anti-runaway devices) to prevent uncontrolled gate movement.
- Clearly marking and, where necessary, providing instructions for manual release and operation.
- Positioning manual release mechanisms so that users are not required to stand in hazardous areas during operation.
- Ensuring that a local isolator is provided to isolate all sources of supply to the gate, positioned in a readily accessible and clearly identified location.
- Including manual operation procedures in the handover documentation and client training.

5.8 Automatic Operation

General Requirements:

Automatic gates shall be designed, installed, and maintained so that powered operation does not expose persons to undue risk of injury. The gate, its operator, and associated control systems must function safely under all reasonably foreseeable operating conditions.

Hazards May Arise Where:

- The gate operates with excessive force, speed, or momentum.
- Safety devices are absent, incorrectly positioned, bypassed, or rendered ineffective due to factors such as excessive gate speed, weight, or operating force.
- Users are required to operate controls from unsafe positions, such as standing within the gate's travel path.
- Control logic fails to detect obstructions, resulting in crushing, shearing, or impact hazards.
- The system resets or restarts unexpectedly after power restoration.

Compatibility and Conformance:

- Control measures shall ensure that automatic operation is safe, reliable, and compliant with relevant standards. Measures shall include:
- Designing automation systems to operate within acceptable limits of force and speed, in accordance with applicable standards, to ensure that all installed safety devices remain effective under normal operating conditions.
- Providing suitable safety devices to prevent entrapment and impact hazards.
- Positioning access control devices (e.g. keypads, swipe readers, intercoms) so that users cannot stand within the sweep or travel path of the gate when operating the system.
- Ensuring that the control system incorporates fault monitoring and fails to a safe state in the event of malfunction.
- Preventing uncontrolled restart following power loss or restoration unless safe conditions are confirmed.
- Including automatic operation instructions and safety information within client handover documentation and training.
- Conducting commissioning tests to verify correct operation of all automatic functions, safety devices, and control logic prior to handover.

6. Hazard Assessment Process And Recording

6.1 General

Installation and maintenance companies are required to conduct comprehensive hazard assessments for gate and barrier systems to ensure compliance and demonstrate due diligence. These assessments are crucial in identifying potential risks and implementing necessary controls to ensure safety throughout the system's lifecycle.

6.2 When to Conduct Assessments

1. **For New Installations:** Assessments should be completed to certify that new systems are installed correctly.
2. **Before Maintenance:** Conduct an assessment prior to engaging in reactive or planned maintenance for the first time to understand existing conditions and potential hazards.
3. **Upon System Modification:** Reassess the system anytime modifications are made to ensure continued compliance and safety.

6.3 Ongoing Maintenance and Safety Checks

- Routine maintenance should regularly include safety checks to confirm the system remains safe and functional.
- Full re-documentation of the compliance assessment is not required at every maintenance visit unless significant changes or issues are identified. An Example would be: change of class from fully automatic to hold to run or significant alteration to the equipment installed on the gate – new access controlling device.
- Frequency of the ongoing maintenance and safety check should be at the direction of the manufacturer.

6.4 Steps for Conducting Hazard Assessments

Step 1: System Description

Document the system's specifics, including design, user interactions, environment, activation methods, and expected duty cycle.

Describe how the system operates, the nature of its users, environmental conditions affecting it, and how it is activated and used day-to-day.

Step 2: Hazard Identification

Identify all potential hazards related to the system.

List hazards associated with structural integrity, electrical safety, safety distances, guards, enclosures, control system integrity, moving parts, and wear and tear, considering both normal use and foreseeable misuse.

Step 3: Initial Hazard Resolution

Propose measures to eliminate or mitigate as many identified hazards as possible.

For new or existing systems, **suggest design improvements or safety enhancements** such as better guards, enclosures, or modifications to control systems.

Step 4: Control of Remaining Hazards

Implement control measures for hazards that cannot be fully eliminated.

Step 5: Identification of Residual Hazards

Recognise and document any hazards that persist after initial mitigation efforts.

Focus on the risks to vulnerable users and consider the impact on vehicles, noting any hazards that could still present risks despite earlier controls.

Step 6: Residual Hazard Controls

Establish controls based on the likelihood and frequency of residual hazards.

Step 7: Provision of Gate Technical File

Create and update a comprehensive Technical File.

The manual should include safe operation instructions, fault identification and response guidelines, and detailed maintenance procedures. It should explain how to isolate the system for manual operation and detail necessary steps to keep the system in safe working condition through inspections, cleaning, lubrication, adjustment, routine part replacements, and safety testing.

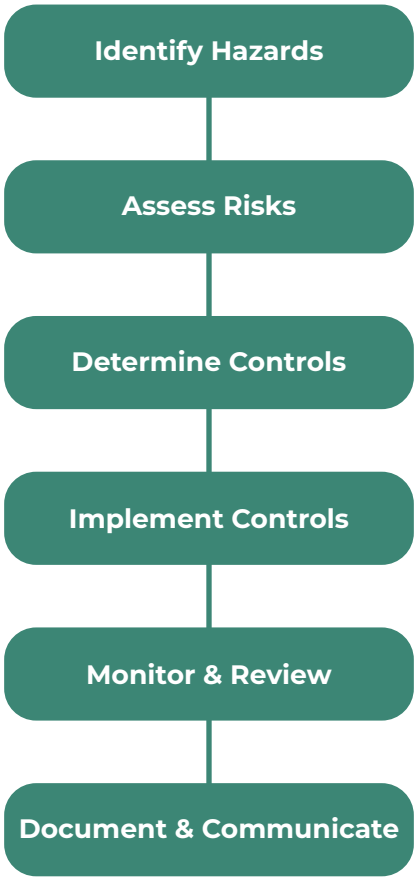
6.5 Importance of Documentation

Maintaining accurate and thorough documentation is crucial for:

Safety: Ensures that all users and maintenance personnel are aware of the proper procedures and hazards associated with the system.

Legal Protection: Provides evidence of due diligence and proactive safety management in case of incidents. These steps form a comprehensive framework for assessing and managing risks associated with gate and barrier systems,

6.6 Hazard Assessment Process Flow Diagram



7. Residual Hazard Assessment And Control

Residual hazards refer to those remaining dangers after all safety measures have been applied. These are hazards that persist despite the best design and safety features being implemented. The management of these hazards is crucial, particularly in environments where vulnerable individuals, such as the very young, elderly, or physically weak, are present, or where vehicle interactions are likely.

7.1 Assessing Residual Hazards

A residual hazard might be the impact of a gate leaf exerting a gentle force onto a person or object before retracting on obstacle detection - while this might be within acceptable standards for most, it could pose a significant risk to more vulnerable populations. Therefore, a detailed assessment should consider:

- **Severity of Potential Harm:** Evaluate the degree of harm that could result from each identified residual risk.
- **Environment Specific Risks:** In places like schools, higher levels of protection should be prioritised, such as implementing non-contact solutions or additional safety features that exceed standard requirements.
- **Vehicle Interactions:** Assess risks related to vehicle movements, which are not the primary concern of most safety standards focused on human protection.
- **Human Interactions:** Assess risks related to likelihood and frequency of human interaction with the machine.

7.2 Control Measures for Residual Hazards

To effectively manage these hazards, the following control measures should be considered, listed in order of their effectiveness in protecting vulnerable users:

	Control Measure	Description
1	Non-contact Detection Systems	To prevent any physical contact with the gate.
2	Very Low Force Settings	Reducing the force exerted by the gate to minimal levels.
3	Additional Safety Sensors	Enhancing detection capabilities to cover more areas.
4	Warning Lamps and LED Strips	Providing visual alerts about the gate's operation.
5	Audible Warning Devices	Alerting nearby individuals with sound.
6	Activation Devices	Ensuring gates operate only when safely activated.
7	Pedestrian Railings and Signage	Guiding and informing pedestrians.
8	Safety Lighting and Reflective Tape	Enhancing visibility and marking dangerous areas.
9	Traffic Lights and Vehicle Detectors	Managing and monitoring vehicle movements.
10	Traffic Calming Measures	Slowing down vehicle traffic near the gate installation.
11	User Warnings, Instructions, and Training	Educating users on safe practices.

7.3 Implementation Based on Local Risk Assessment

The selection of suitable residual hazard controls must be based on a thorough local risk assessment, considering the likelihood of occurrence and frequency of exposure to hazards. The greater the likelihood of contact with a residual hazard, the more rigorous the control measures should be.

7.4 Documentation and Training

Comprehensive documentation of risks and the measures taken to mitigate them is essential. In the event of an incident, these documents will be critical in evaluating whether adequate precautions were taken. Additionally, providing written user warnings, safe use instructions, and training is an integral part of controlling residual hazards.

8. Maintenance

Clear maintenance requirements should be outlined to ensure ongoing safety, reliability

Key aspects include:

8.1 Manufacturer's Recommendations

- Maintenance must follow the manufacturer's specifications for proprietary components, including motors, control systems, sensors, and safety devices.
- Frequency and scope of servicing should align with OEM guidelines, ensuring optimal performance and compliance with warranties.
- Where manufacturers specify service intervals, part replacements, or adjustments, these must be strictly adhered to.

8.2 General Maintenance Requirements (Reasonably Practicable Measures)

- In the absence of specific manufacturer instructions, maintenance should be aligned with respect to the below:
- Routine inspections should cover:
  - Structural integrity (frames, tracks, hinges)
  - Operational function (smooth opening/closing, force limits)
  - Safety systems (photoelectric beams, pressure edges, emergency stops)
  - Electrical components (wiring, control panels, backup power)
- Preventative maintenance should ensure the gate remains fail-safe and fail-secure as per risk assessments.

9. Conclusion

The National Code of Practice for Gates and Automation has been developed to provide a structured approach to improving safety, compliance, and best practices in the industry. This Code sets a benchmark for ensuring the safe design, installation, and operation of automatic and manual gates in Australian workplaces.

As this document is a draft, it will undergo a comprehensive external review to ensure it aligns with the latest industry standards, legislative requirements, and technological advancements. Stakeholder feedback, including input from manufacturers, installers, regulators, and workplace safety experts, will be integral to refining the final version.

While voluntary, this Code serves as a valuable resource for industry professionals seeking to uphold the highest safety and performance standards. Compliance with its recommendations will support businesses in meeting their Work Health and Safety (WHS) obligations while fostering a culture of risk awareness and continuous improvement. By adhering to the principles outlined, the industry can reduce hazards, improve reliability, and enhance public and workplace safety.

Australian Fencing and Gate Industry acknowledges the contributions of all individuals and organisations that have participated in the development of this Code. Their expertise and commitment to safety will ensure the final version provides meaningful and practical guidance for the gate and automation sector.

AUSTRALIAN
FENCING
AND GATE
INDUSTRY

Gates & Automation
Code of Practice

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