

# Falling in Control:

Specifying Fall-Arrest Systems to  
Achieve Elevated Safety Outcomes



## Introduction

---


In Australia, working at heights continues to be one of the highest risk activities in the workplace. The number of fatalities attributed to falls has consistently exceeded 20 people per year for the last 15 years.<sup>1</sup> The very nature of working at elevated heights attracts an elevated degree of risk.

In response, regulators are continuously looking at ways to reduce this particular cause of injury and death. A complex framework of building regulations, standards and workplace safety legislation has been enacted, setting out legal obligations in relation to providing safe access to ceilings and roof levels. These regulations provide design and performance requirements for access ladders, including the safety measures needed when working at heights.

However, there are situations where the standard fall protection controls applicable to access ladders – specifically, ladder enclosures, guardrails and intermediate landings -- might not be effective in preventing a fall on their own. This is where fall-arrest systems come into play as part of a comprehensive approach to height safety. Mandated by fall protection standards in certain scenarios, fall-arrest systems play a critical role in minimising workplace injuries and fatalities by reducing the impact of a fall on the human body.

This whitepaper takes a closer look at the regulatory requirements applicable to fall-arrest systems and how access ladders complement and/or work in parallel with such systems to achieve compliance and elevated safety outcomes.





**“High quality access ladder systems should be specified to complement and work in parallel with fall-arrest systems to prevent the occurrence of workplace falls and fall-related injuries.”**

## Fall Protection on Access Ladders

---

### Ladder enclosures, guardrails and intermediate landings

The design requirements for fixed access ladders are set out in AS 1657:2018 Fixed platforms, walkways, stairways and ladders - Design, construction and installation. This Standard provides several safety measures applicable to access ladders, including ladder enclosures (side screens or ladder cages) to prevent a fall and handrails on either side of the ladder. For heights above six metres, intermediate landings are required to limit the distance a person could fall.

### The risks of non-compliance

It may be assumed the caged access ladders with guardrails are technically compliant with the building code on their own. However, Work Health and Safety (WHS) legislation imposes a broader safety duty – employers are required to provide a safe workplace for their employees, especially for those who are required to work at heights. Even where the safety measures in AS 1657:2018 are implemented, there could be other factors that create a significant risk of injury necessitating additional safety measures to achieve compliance.

In 2019, Workplace Health and Safety Queensland highlighted various issues which might increase the risk of a slip or fall where ladder cages and guardrails are employed.<sup>2</sup> For example, excessive vertical distance from the bottom of the ladder cage to the top of the guardrail can contribute to the likelihood of a fall incident. Similarly, if the horizontal distance from the ladder to the guardrail is too small in any direction, a worker could still fall over the guardrail unimpeded.

Other factors relevant to the installation context can contribute to the likelihood of falls. Fixed ladders that are sloped close to vertical (i.e. in excess of 75°) are more difficult to climb. Rain or high winds when using the ladder can contribute to difficulties maintaining grip and balance.

It is important to note that falls from under six metres can still be fatal. According to SafeWork Australia data, between 1 January 2003 and 31 December 2015, 359 workers were killed following a fall from a height with half the falls involving a height of three metres or less.<sup>3</sup>

## Fall-Arrest Systems

---

### What is a fall-arrest system?

Fall-arrest is a key component of a comprehensive approach to fall protection and is a safety measure distinct from other measures such as guardrails and ladder cages.<sup>4</sup> Rather than preventing falls, fall-arrest systems apply when a fall has occurred, minimising or preventing the eventual impact by applying decelerating forces on the human body during the fall.

A fall-arrest system generally includes the following:<sup>5</sup>

- an anchor point to which a worker can be tethered;
- a full body harness;
- connectors attaching the harness to the anchorage such as lanyards, carabiners, hooks and adjusters; and
- an energy absorption component that minimises the impact of the force created during a fall on the human body.

### Compliance with AS/NZS 1891

Under AS 1657:2018, if the use of ladder enclosures, guardrails and intermediate landings are not practicable, other safety measures should be employed such as a fall-arrest system that is compliant with the *AS/NZS 1891 Industrial fall-arrest systems and devices* series. The AS/NZS 1891 series provides standards for the manufacturing and testing of industrial fall-arrest equipment, including:

- harnesses and lanyards;
- horizontal and vertical lifeline systems; and
- fall-arrest devices.

The specifications provided in *AS/NZS 5532:2013 Manufacturing requirements for single point anchor devices used for harness-based work at height* may also be relevant.

Part 4 of the AS/NZS 1891 Series (AS/NZS 1891.4:2009) provides for the selection, safe use and maintenance of industrial fall-arrest systems and devices. Part 4 contains several key performance and inspection requirements, including:

- the fall-arrest system should include energy absorbers that minimise the impact of the force created during a fall on the body to less than 6kN (600kg);
- anchor points used for a fall-arrest system should be capable of sustaining 15kN (1500kg) for one person, and 21kN (2100kg) for two persons; and
- regular inspections of safety equipment by qualified experts are required to ensure fall-arrest systems remain effective and compliant.

Note that the AS/NZS 1891 series is currently pending revisions to reflect changes in technology and industry practice.<sup>6</sup>

## Maximising Safety and Achieving Compliance

---

Fall protection encompasses a variety of systems and approaches designed to work in combination to reduce the risk of a fall. Which safety measures are appropriate for a particular setting is dependent on the application context and the specific factors contributing to the risk of falls. Compliance with WHS legislation and building codes requires consideration of all elements that contribute to safety when working at heights.

High quality access ladder systems should be specified to complement and work in parallel with fall-arrest systems to prevent the occurrence of workplace falls and fall-related injuries. Fixed access ladders should comply with the design and performance requirements set out in AS 1657:2018. Under this Standard, a caged access ladder or ladline is required where a person is at risk of falling six metres or higher. The angle of slope, height and width, and clearance spaces with respect to an access ladder should conform to the required specifications. Access ladders should also have slip-resistant treads and rungs that are evenly spaced apart.

Pull-down access ladders may be considered for a work environment. CodeMark certification provides assurance that the product complies with the relevant safety and building standards. Some ladder systems can be manufactured to the exact ceiling height, ensuring that the product meets the relevant dimensional requirements regardless of installation context. There are modular access solutions on the market that are “cut-to-size” to fit into an installation, increasing the risk of irregular tread and rung spacing.

Whether a fixed or pull-down access ladder is specified, steps should be taken to ensure the system is also compliant with AS/NZS 1891.4:2009. The ladder system should be able to incorporate enclosed cages or fall-arrest systems depending on height and application. It is recommended to identify suppliers and manufacturers who are certified to install fall-arrest systems and properly equipped to inspect and maintain safety equipment in compliance with all parts of AS/NZS 1891.



## AM-BOSS

---

With over 40 years industry experience, AM-BOSS manufactures purpose-built fixed access and pull-down access (PDA) ladders specially designed to the requirements of each individual environment, for both internal or external access. The company's range of access ladders are installed on all types of new and existing buildings, from government buildings and factories to hospitals and homes.

A key supplier to government, healthcare and industrial organisations, AM-BOSS is the premier choice for Australia's most discerning and safety-conscious clients.

### **AM-BOSS Access Ladders and Fall-Arrest Systems**

AM-BOSS Access Ladders combine high quality and superior performance with meticulous design credentials. Key design features include:

- Innovative access system and streamlined installation process. Premium-grade materials, including zinc-plating of metal components.
- Heavy Duty PDA Ladder series with load ratings up to 400kg. Fire-resistant models that are fully compliant with AS 1530.4:2005 and -/90/90 fire rated.
- A range of handrail and grabrail styles to meet the safety needs of any workplace.
- Floor-to-ceiling heights catered for up to 5500mm.

AM-BOSS offers the only PDA ladder on the Australian market that is compliant with the NCC and is CodeMark-certified.

This 100% Australian-owned and operated company can create bespoke ladders and systems that meet project-specific requirements, including specifications relating to size, pitch and angle. AM-BOSS PDA Ladders are never cut-to-suit, ensuring safe access provisions for all users, equal tread spacing and compliance with the relevant Australian Standards.

In addition to its extensive catalogue of access solutions, AM-BOSS is certified to install and test fall-arrest systems, including secure anchor points, static lines, ladlines and abseil anchors. A comprehensive range of harnesses and height safety kits are available, made from the highest quality materials for long-lasting reliability and strength. These trusted solutions can be individually modified to meet the needs of the installation environment.

The company is also equipped to conduct inspection and maintenance to ensure compliance with all parts of the AS/NZS 1891 series in relation to industrial fall-arrest systems.



## REFERENCES

- <sup>1</sup> Working At Heights Association. "Injury Statistics." WAHA.  
<https://www.waha.org.au/injury-statistics> (accessed on 10 December 2019).
- <sup>2</sup> Australian Institute of Health & Safety. "Safety warning over falls from fixed ladders with cages." AIHS.  
<https://www.aihs.org.au/news-and-publications/news/safety-warning-over-falls-fixed-ladders-cages> (accessed on 10 December 2019).
- <sup>3</sup> Safe Work Australia. "Working at heights." Safe Work Australia.  
<https://www.safeworkaustralia.gov.au/heights> (accessed on 10 December 2019).
- <sup>4</sup> Working At Heights Association. "Hierarchy of Controls." WAHA.  
<https://www.waha.org.au/hierarchy-of-controls> (accessed on 10 December 2019).
- <sup>5</sup> Thomas, Dave. "Fall Arrest Equipment." Health & Safety International.  
<https://www.hsimagazine.com/article/fall-arrest-equipment-437> (accessed on 10 December 2019).
- <sup>6</sup> Working At Heights Association. "Australian Standards – Status on AS/NZS1891 Series." WAHA.  
<https://www.waha.org.au/technical-bulletins/update-on-changes-to-australian-standards-1891-series> (accessed on 10 December 2019).

