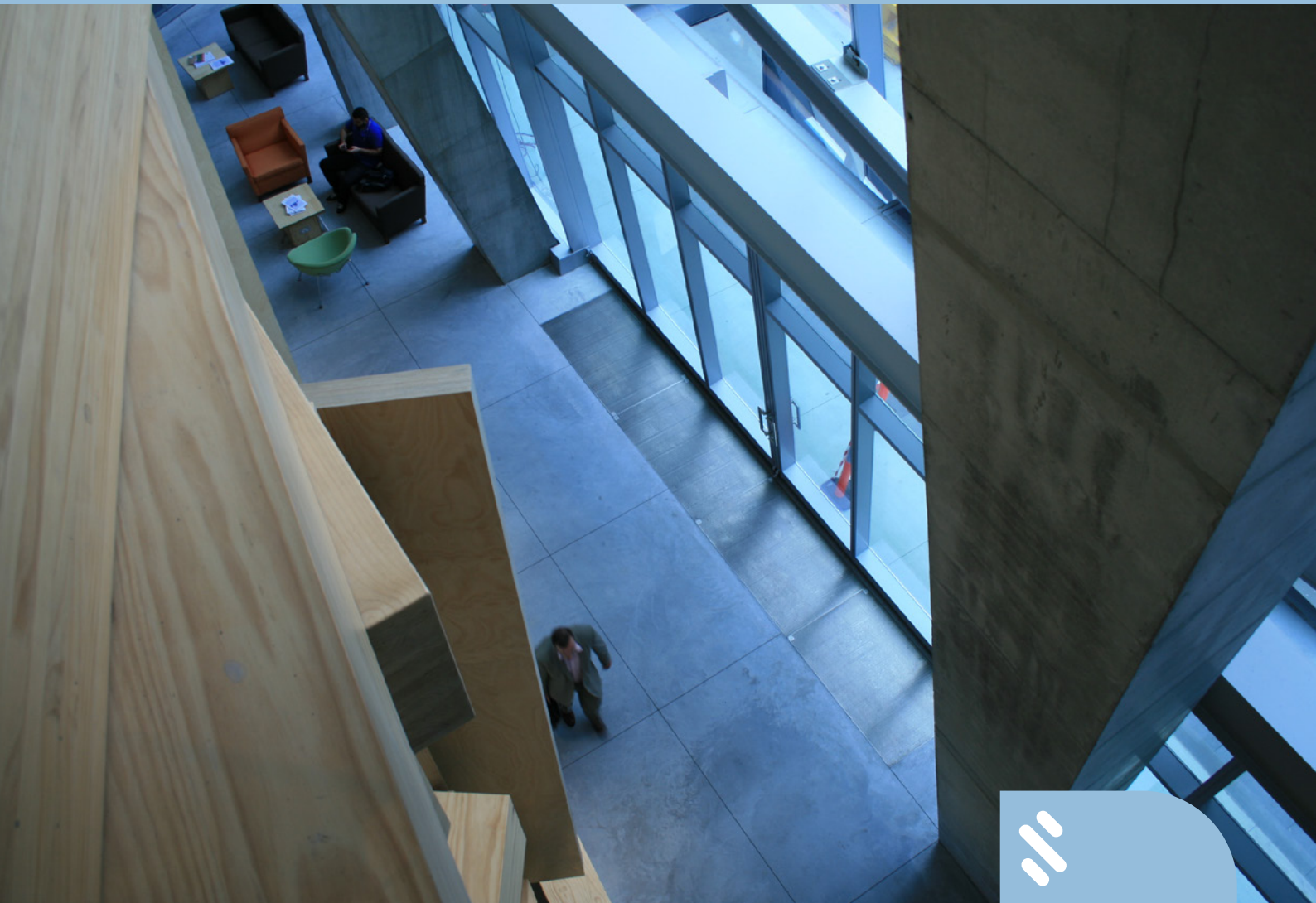


Safety Lessons:

A Specifier's Guide to Creating Safe & Sustainable Educational Facilities



Introduction

In Australia, the number of primary and secondary students grows every year. In its Education Future Report 2016, research consultancy firm McCrindle highlights that there has been a significant increase in the total number of students enrolled in Australian schools in recent years.¹ In 2015, there were 3,730,694 students enrolled in Australian schools. According to government statistics, this figure grew to 3,893,834 in 2018.²

To support increasing student numbers, the number of primary and secondary schools across the country, especially larger schools, has grown.³ With more students than ever before, there is now a greater demand for safe, healthy and sustainable educational facilities. Poorly-designed schools can pose a safety risk to students, teachers and visitors, which

in turn can lead to legal liability, excessive medical costs and poor academic performance. Against this backdrop, it is critical for designers and specifiers to be fully informed as to the key design objectives and safety considerations relevant to the education sector.

In this whitepaper, we provide a concise look at the design standards that apply to schools in Australia and examine the key considerations when specifying for these facilities, with a particular focus on child-specific safety risks and sustainability requirements. In doing so, we provide designers and specifiers with the essential knowledge they need to create safe and sustainable learning spaces that meet the needs of a wide variety of end users.

Design Principles

The key objective when designing educational facilities is to deliver high quality spaces that enable teaching and learning outcomes for students and teachers. To achieve this end, some key design principles should be observed, including:⁴

- a focus on sustainability, efficiency and durability;
- creating accessible and inclusive environments suitable for a wide range of users; and
- implementing design features that promote health, safety and security.

These principles are shared by the planning authorities and educational departments of each State and Territory in Australia. This is evident in the various design guidelines that apply to the education sector, which are referenced below.

Mandatory Design Requirements

As a matter of best practice, designers and specifiers should ensure that educational facilities comply with the relevant Australian building standards and regulations. This includes the relevant specification, performance and testing requirements in the National Construction Code (NCC), local government laws and Australian standards.

In addition, designers and specifiers should refer to the design guidelines issued by various planning authorities and educational departments across the country, for example the Design Guide for Schools in New South Wales; the Design Standards for DETE Facilities in Queensland; and the Building Quality Standards Handbook in Victoria. These guidelines provide for a consistent and structured approach to designing educational facilities in Australia.





Specifying for Safety

When designing and specifying for the education sector, implementing a safe design of the built environment is a primary consideration. Schools conduct many activities that present a variety of safety hazards.⁵ Safety considerations cover a range of areas, including the management of hazardous substances, circulation and access, and machinery, electrical and gas safety.

Younger children are particularly vulnerable to accidents such as trips, falls and finger entrapments. According to the Victorian Government's Better Health Channel, falling is the most common cause of injury for children of all ages.⁶ Accordingly, we discuss trip hazards, slip resistance and entrapment issues in more detail below.

Trip Hazards

Education facility design should aim to reduce trip hazards caused by changes in the level of paths, grates, field inlets and other protrusions.⁷ Designers and specifiers should refer to the relevant legislation and standards that set the construction tolerances for abutment of surfaces for floor or ground surfaces on continuous travel and access paths. In this area, one of the key standards is AS 1428.1-2009 Design for access and mobility - General requirements for access - New building work.

Showers and toilets are particularly hazardous, especially for running children. Traditional drains are not always secure and are prone to foot entrapments. To eliminate trip hazards in this context, floor surfaces where draining is required (e.g. showers, toilets, thresholds to building entries) should be levelled. Specifiers should select drainage products that feature a slim profile or which enable seamless integration into the floor surface. Where the floor covering is vinyl (a common choice in educational projects), a specially-designed drainage product that enables a linear drain in a vinyl floor is required.

Slip Resistance

Flooring surfaces in educational facilities should have slip resistance appropriate to the installation context. Traffic flow and volume are key considerations in this regard. Flooring products and surfaces are required to comply with AS/NZS 4586:2013 - Slip Resistance Classification of New Pedestrian Surface Materials and the NCC and follow the guidelines set out in HB 197:2014 – An introductory guide to the slip resistance of pedestrian surface materials.

Leading suppliers offer slip-resistant floor and drainage solutions, including drainage mats. Commercial-grade stainless steel entry mats are an aesthetic and practical solution for high traffic areas into buildings.

Entrapments

Design guidelines for the education sector will typically require that any holes, openings or slots shall not constitute entrapment hazards for feet, hands, fingers and head.⁸ This applies to a range of building elements such as drainage gratings, grille screens, fences and open steps.

Careful specification of these elements can reduce the safety risk associated with entrapment hazards. For example, designers and specifiers can eliminate foot, toe and finger entrapments in grated drains by using either tile insert drains or lockdowns for grates which have the grates locked to the drainage channel.

Outdoor Areas

When designing outdoor areas, practitioners should anticipate potential flooding and the effects of stormwater discharge and disposal. High capacity drainage solutions that not only reduce risk of trips and entrapments but also efficiently manage stormwater should be selected.

Sustainability, Health and Wellbeing

Given the growing concerns over the environment, it is imperative that schools are efficient, environmentally-friendly and sustainable. Sustainable design is synonymous with creating spaces that address end-user comfort and well-being and improving building performance.⁹ This is reflected in design guidelines across the country which provide requirements for thermal and acoustic comfort, ventilation, hygiene and indoor air quality.

Another component of sustainable design is using sustainable, eco-friendly building products and materials to reduce consumption of non-renewable resources and minimise waste. Products and materials that can be reused or with a long shelf life have a reduced environmental impact. Stainless steel, for example, is highly recyclable and durable.¹⁰ Furthermore,

products made from locally-sourced steel will require less embodied energy to manufacture.¹¹ Considering the variety of building products on the market, it is important to scrutinise the sustainability credentials of any given product to verify that it has been sourced and produced responsibly and using it has minimal impact on the environment.

A consistent feature of design guidelines for the education sector is the priority given to building products with environmental certification. For example, the Queensland Design Standards provides that products certified under Green Tag, Good Environmental Choice Australia or equivalent systems should be preferred over uncertified building products.¹² This approach is echoed in the guidelines of other States and Territories.¹³



Balancing Performance, Functionality and Aesthetics

Recent studies indicate that poor design and subpar building conditions can negatively impact academic performance and student well-being.¹⁴ Accordingly, designers and specifiers should identify design solutions that deliver long-lasting performance and functionality while also being visually

pleasing. Solutions that feature slimline profiles, enable seamless transition between outdoor and indoor areas and include surfaces and materials that are easy to clean and maintain can all contribute to a clean, modern aesthetic that can stand the test of time.



Stormtech

Since 1989, Stormtech has provided efficient architectural drainage solutions for showers, bathrooms, thresholds, balconies, paved areas and pools. This Australian-owned company offers narrow profile, high capacity products that have been used in prestigious commercial projects in Australia and internationally. All Stormtech grates are made of high quality Australian-manufactured stainless steel.

The Stormtech range of products have won multiple awards for design innovation and are supported by an industry-leading customer service experience. The company is committed to eco-friendly design and participates in global stewardship programs. Stormtech offers drainage products with Gold-Level Global GreenTag certification.

Stormtech Linear Drains

Design and manufactured in Australia, the patented Stormtech linear drainage system is a high performance and premium quality drainage solution that addresses the safety and sustainability requirements of contemporary buildings, including educational facilities.

This range features slimline grates made from marine-grade Australian stainless steel ideal for a wide range of internal and external residential and commercial applications, including large-scale outdoor settings, hospitals, bathrooms and sporting grounds. Robust and stylish, this solution provides efficient and easy access in high traffic areas and can be used in new building work, renovation projects and retrofit applications. A broad selection of grate styles and finishes are available to meet virtually any contemporary drainage requirement.

Linear drainage delivers level-plane, that is flush with the ground surface, “zero stepdown” drainage for both indoor and outdoor applications. This feature reduces the risk of trips and entrapments and provides safe access to toilets, bathrooms and showers. Linear drainage also promotes consistent drainage flow reducing the risk of “ponding” which can create slip hazards.

This versatile linear drainage system can be connected directly with all standard plumbing fittings, with a modular design that can be tailored to almost any environment. This system is also certified under the Greentag and Watermark Standards Australia International programs, ensuring it meets the sustainability requirements that apply to all educational facilities across Australia.

Stormtech Slot Drains

This advanced drainage solution for high capacity water removal is ideal for stormwater run-off and surface water drainage in outdoor areas such as driveways, paved areas, sporting areas and garden edges. The SD90 features a 25mm opening slots draining into a concealed 90mm drain pipe. This slot drain system, which is also Greentag and Watermark certified, can be completed with a 30mm wide architectural-style stainless steel grate as an optional item.

Stormtech Drainage Mats

Stormtech also offers custom-made stainless steel entry drainage mats, which are ideal for high-traffic areas in public buildings. Available in a range of custom designs and finishes, these mats can be customised to match the aesthetic of any project, enhancing the functionality of these spaces as well as their visual appeal.

REFERENCES

- ¹ McCrindle Research. "Results from the Education Future Report 2016." McCrindle. <https://mccrindle.com.au/insights/blogarchive/results-from-the-education-future-report-2016> (accessed 6 October 2019).
- ² Australian Government. "4221.0 - Schools, Australia, 2018." Australian Bureau of Statistics. <https://www.abs.gov.au/ausstats/abs@.nsf/mf/4221.0> (accessed 6 October 2019).
- ³ Above n 1.
- ⁴ New South Wales Government. "Design Guide for Schools." Government Architect New South Wales. <https://www.governmentarchitect.nsw.gov.au/resources/ga/media/files/ga/design-guides/design-guide-for-schools-2017-08-24.pdf> (accessed 6 October 2019).
- ⁵ Queensland Government. "Hazards and risks." Department of Education. <https://education.qld.gov.au/initiatives-and-strategies/health-and-wellbeing/workplaces/safety/hazards> (accessed 6 October 2019).
- ⁶ Victorian Government. "Child safety and injury protection." Better Health Channel. <https://www.betterhealth.vic.gov.au/health/healthyiving/child-safety-and-injury-prevention> (accessed 6 October 2019).
- ⁷ Queensland Government. "Design Standards for DETE Facilities." Department of Education, Training and Employment. <https://qed.qld.gov.au/det-publications/standards/Documents/design/design-standards-dete-facilities.pdf> (accessed 6 October 2019).
- ⁸ Ibid.
- ⁹ United States Government. "Sustainable Design." US General Services Administration. <https://www.gsa.gov/real-estate/design-construction/design-excellence/sustainability/sustainable-design> (accessed 6 October 2019).
- ¹⁰ Anejo, JA. "Impact Of Concrete, Steel And Timber On The Environment: A Review." International Journal of Technology Enhancements and Emerging Engineering Research Vol. 2, No. 7 (2014); <https://www.ijteee.org/final-print/july2014/Impact-Of-Concrete-Steel-And-Timber-On-The-Environment-A-Review.pdf> (accessed 6 October 2019).
- ¹¹ Ibid.
- ¹² Above n 7.
- ¹³ Victorian Government. "Building Quality Standards Handbook." Department of Education and Training. <https://www.education.vic.gov.au/Documents/school/principals/infrastructure/BuildingQualStandHdbk%202018.pdf> (accessed 6 October 2019).
- ¹⁴ Verizon Media. "School Design, Classroom Layout Can Heavily Affect Student Grades, Learning: Study." Huffington Post. https://www.huffpost.com/entry/school-design-student-grades_n_2404289 (accessed 6 October 2019).