



Emergency Egress for Occupants with Disability

Consultation Regulation Impact Statement

September 2014

This Regulation Impact Statement for consultation accords with the requirements of *Best Practice Regulation: A Guide for Ministerial Councils and National Standard Setting Bodies* endorsed by the Council of Australian Governments in 2007. Its purpose is to inform interested parties of proposed amendments to the National Construction Code to address emergency egress for persons with disability. Comments on this Regulation Impact Statement are welcome until 31 October 2014.

The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a joint initiative of all levels of government in Australia, together with the building industry. Its mission is to oversee issues relating to health, safety, amenity and sustainability in building. The ABCB promotes efficiency in the design, construction and performance of buildings through the National Construction Code, and the development of effective regulatory and non-regulatory approaches. The Board aims to establish effective and proportional codes, standards and regulatory systems that are consistent between States and Territories. For more information see [the ABCB website](#).

Consultation

This is a consultation document where interested parties are invited to provide comment on any matter raised in this RIS. A series of consultation questions have been provided throughout the document, and respondents are encouraged to address these items to assist in the development of this document. Comments are invited by close of business Friday 31 October 2014, and can be emailed to abcbbris@iinet.com.au with the subject title "Emergency Egress RIS".

The ABCB Office will review all comments received and incorporate stakeholder information and data into the regulatory analysis, as appropriate. The RIS will be revised in the light of stakeholder comments and will be forwarded to the Board as an input into its decision-making.

The Consultation RIS can be downloaded to the ABCB website at abcb.gov.au/consultation/regulation-impact-analysis/consultation-ris and click on the link to "Emergency Egress RIS".

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Glossary

Class 1a building	A single dwelling being— (i) a detached house; or (ii) one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit.
Class 1b building	(i) a boarding house, guest house, hostel or the like— (A) with a total area of all floors not exceeding 300 m ² measured over the enclosing walls of the Class 1b; and (B) in which not more than 12 persons would ordinarily be resident; or (ii) 4 or more single dwellings located on one allotment and used for short-term holiday accommodation which are not located above or below another dwelling or another Class of building other than a private garage.
Class 2 building	A building containing 2 or more sole-occupancy units each being a separate dwelling.
Class 3 building	A residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including— (a) a boarding house, guest house, hostel, lodging house or backpackers accommodation; or (b) a residential part of a hotel or motel; or (c) a residential part of a school; or (d) accommodation for the aged, children or people with disabilities; or (e) a residential part of a health-care building which accommodates members of staff; or (f) a residential part of a detention centre.
Class 4 building	A dwelling in a building that is Class 5, 6, 7, 8, or 9 if it is the only dwelling in the building.
Class 5 building	An office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8, or 9.
Class 6 building	A shop or other building for the sale of goods by retail or the supply of services direct to the public, including— (a) an eating room, bar area that is not an assembly building, shop or kiosk part of a hotel or motel; or (b) a dining room, bar area that is not an assembly building, a shop or kiosk part of a hotel or motel; or (c) market or sale room, showroom, or service station.

Class 7a building	A car park.
Class 7b building	A building for storage, or display of goods or produce for sale by wholesale.
Class 8 building	A laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale, or gain.
Class 9a building	A health-care building, including those parts set aside as a laboratory.
Class 9b building	An assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that is of another Class.
Class 9c building	An aged care building.
Class 10 building	A non-habitable building.
Deemed-to-Satisfy	Provisions which are deemed to satisfy the mandatory requirements of the BCA.
Fire-isolated ramp	A ramp within a fire-resisting enclosure which provides egress from a storey.
Fire-isolated stair	A stairway within a fire resisting shaft.
Functional Statement	A statement which describes how a building achieves the Objective.
Performance Requirement	A requirement which states the level of performance which a Building Solution must meet.
Sole-Occupancy Unit (SOU)	A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier.

Acronyms

ABCB	Australian Building Codes Board
ABS	Australian Bureau of Statistics
AS	Australian Standard
BS	British Standard
BCA	Building Code of Australia
BAPC	Building Access Policy Committee
BCC	Building Codes Committee
DDA	Disability Discrimination Act
D-t-S	Deemed-to-Satisfy Provisions
HRSC	Commonwealth House of Representatives Standing Committee on Legal and Constitutional Affairs
NCC	National Construction Code
NCIS	National Coronial Information System
PEEP	Personal Emergency Evacuation Plan
RIS	Regulation Impact Statement
SOU	Sole-occupancy Unit
TGSI	Tactile Ground Surface Indicators
VoSL	Value of Statistical Life

Introduction

The Egress for All Occupants project has been a project on the Australian Building Codes Board (ABCB) work program since 2011. The project arose from a major initiative of government, the Access to Premises Standards, which were developed in parallel with a revised Building Code of Australia (BCA) due to concern with the lack of certainty regarding practical compliance obligations under the Disability Discrimination Act (DDA).

In 2000, the ABCB established the Building Access Policy Committee (BAPC), which included representatives from the Human Rights and Equal Opportunity Commission, the Australian government's Attorney General's Department, the disability sector and representatives from the construction industry. The Committee was tasked to recommend changes to the BCA, to consult widely with industry and the community and to provide advice to the ABCB on access-related issues.

During the development of the Premises Standards, it was identified that although there were practical solutions available to assist in providing independent and equitable access to buildings for occupants with disability, there were no readily available solutions for egress in the event of an emergency. The BAPC requested the ABCB continue to research solutions in the area of egress for all occupants.

The Premises Standards continued through a lengthy process of negotiation including a period of review by the House of Representatives Standing Committee on Legal and Constitutional Affairs (HRSC). The HRSC sought submissions to allow it to consider, and report on, the appropriateness and effectiveness of the draft Premises Standard in:

- achieving its objects;
- its interaction with other legislative schemes; and
- whether the standards would have any unjustifiable impact on any particular segment of the industry.

In the report Access All Areas, the HRSC acknowledged that there were matters that would not be finalised in time for inclusion in the Premises Standards, and discussed these matters including that of emergency egress in Chapter 6; Recommending:

“...the ABCB undertake further research to identify deemed-to-satisfy provisions for emergency egress for people with disability with a view of making changes to the Building Code as soon as possible¹.”

As is the case in most countries, current BCA provisions for emergency egress are reliant on the occupants responding to an emergency by recognising warning cues and using appropriate pathways, such as fire-isolated ramps or fire-isolated stairways, to evacuate. However, in the absence of accessible evacuation pathways and warning systems, evacuation of occupants with disability is generally left to administrative evacuation management procedures located outside of the BCA.

¹ Commonwealth of Australia, Access All Areas (2009) 6.1 Recommendation 16 p.130

Disability advocates suggest that the current BCA technical provisions need to be strengthened. Specifically, to cater for those whose impairment prevents them from using features of the built environment and achieving safe, dignified and independent egress without the assistance of alternative warning cues, and/or assistance recognising and using safe egress paths. Significantly the HRSC considered specific matters that included fire stairs, lifts, visual and other alerts and places of rescue assistance.

In discussing solutions the HRSC suggested that “in order for access to be truly equitable, facilities must also be put in place to allow people with disability to navigate a building independently and with dignity. Requiring people with disability to be escorted or to rely on there being people in the vicinity to provide directions is not satisfactory”.

To seek opinions on a range of proposals and gauge support for their implementation, the ABCB convened an Emergency Egress Forum in April 2011 with representatives from government, industry and the disability sector. Attendees agreed to a range of proposals and an incremental approach being the most appropriate and consistent with the findings of the recommendations of the HRSC. The ABCB’s peak technical committee, the Building Codes Committee (BCC), at its meeting in July 2011, also supported this staged approach.

As identified by earlier research², lifts were seen to offer obvious accessibility advantages over other options for occupants with disability. In considering research into egress solutions including the use of lifts, the ABCB recognised while there had been some developments internationally, it appeared there was a reluctance to mandate the use of lifts for egress. As awaiting developments was not considered a sustainable approach, in 2011 the ABCB endorsed a strategy which included:

- the development of a non-regulatory Handbook for lifts used during evacuation.
- D-t-S Provisions being considered incrementally, with minor amendments being included and more substantive proposals subject of additional impact assessment (this RIS).

This strategy was progressed in 2013 through the release of the ABCB Directions Report on “Egress for All Occupants” and publication of the ABCB non-mandatory handbook “Lifts Used During Evacuation”. Four minor amendments to improve the accessibility of egress paths were also considered and these proposals progressed to inclusion in the 2013 BCA.

This Regulation Impact Statement (RIS) considers a further five proposals that were developed with the assistance of the Emergency Egress Forum and have the potential to impose large costs on the community.

Scope

Emergency events can occur in all buildings. Despite this, Class 1a buildings (houses) and Class 10 buildings (non-habitable buildings) are considered out of scope. Proposals for Class 1b buildings (boarding houses) are limited to accessible areas required to have early smoke detection and alarm systems installed. While emergency events occur in these buildings, the small-scale and close

² Warrington Fire Research, *Emergency Evacuation for Occupants with Disabilities, 2004*– Prepared for the Australian Building Codes Board.

relationship occupants have with these building means egress times are reduced and paths of egress are easily recognisable and often familiar to people occupying the building. Areas of focus include those supported through consultation including accessibility of exits and paths of travel to exits, including fire-isolated stairs and early notification.

The Scope of this Consultation RIS is limited to consideration of options that impact only new buildings. The stock of existing buildings will be considered to be unaffected by the proposals.

Nature and Extent of the Problem

Nature of the Problem

The nature of the problem is twofold. Firstly it relates to life safety and the inability of occupants living with disability being able to evacuate buildings independently in the event of an emergency.

Under the National Construction Code (NCC) buildings are expected to be provided with means of evacuation, which allow occupants time to evacuate safely without being overcome by the effects of an emergency³. Current provisions require emergency egress paths be provided with greater protection, suitable paths of travel and appropriate egress paths to open space. Automatic warning cues are also required in some cases to provide early notification to occupants to achieve this end.

However, the current D-t-S provisions do not prescribe accessible solutions for occupants with disability despite the mandatory Performance Requirements requiring exits and warnings being appropriate to the number, mobility and characteristics of occupants⁴.

Instead, building management practices supplement the needs of occupants with disability through the establishment of evacuation management procedures and Personal Emergency Evacuation Plans (PEEPs), which are designed to address the needs of the person in relation to the specific characteristics of the building. PEEPs are not a requirement of the NCC yet they are recognised as a necessary and effective measure to assist people with disability respond to an emergency by addressing any inadequacies of the built environment. However, reliance on building management practice alone has complexities and although effective in most cases, may not be feasible in all circumstances⁵. Due to the targeted nature of PEEPs, their effectiveness is heavily reliant upon occupants with disability making themselves known to building managers, which may be undesirable or inequitable in day-to-day activities.

Secondly, the nature of the problem involves the obligations under disability discrimination legislation for building owners to ensure, as far as practicable, that dignified and equitable access to and within buildings including its fire safety features is provided for people with disability. The problem involves providing adequate facilities for people with disability to ensure that equitable, dignified and independent egress can occur in the event of an emergency.

³ Functional Statement DF2 & EF2.1 Building Code of Australia 2013

⁴ Extract of Performance Requirement DP4 and EP2.2 Building Code of Australia 2013

⁵ <http://www.fire.nsw.gov.au/news.php?incidents=1187>

Under the DDA, it is unlawful to discriminate against a person because of their disability unless actions to avoid discrimination would cause unjustifiable hardship. For the purposes of the DDA, a person discriminates against another person on the ground of a disability if, because of the disability, the discriminator treats, or proposes to treat, the aggrieved person less favourably than the discriminator would treat a person without the disability in circumstances that are not materially different. In considering the issue of egress from buildings, the HRSC commented:

Every Australian has the right to expect that reasonable provisions will be made to allow them to leave buildings safely in the event of an emergency. Moreover, it is crucial for equitable, dignified, and independent access to buildings that people with disability can be confident that they will also be able to evacuate from a building in a safe, dignified and independent fashion in the event of an emergency.

Therefore, not providing egress from buildings for people with disability is considered unlawful and discriminatory unless a case of unjustifiable hardship can be demonstrated.

A report commissioned by the ABCB Office in 2009 by Warrington Fire Research⁶ identified that the primary limitation with emergency egress for people with mobility disabilities is the inability to independently manoeuvre stairs. The report also highlights the difficulties people with vision and hearing impairments experience in recognising safe paths of egress and traditional warning cues in the event of an emergency.

Consultation Questions:

- Are there any other factors that contribute to the nature of the problem?
- Do you agree with the description of the problem?

Extent of the Problem

The extent of the problem is realised by:

- The number of fatalities of people with disability occurring in new buildings.
- The extent of current unavailability or failing of building management practice which is leading to the undignified egress of people with disability.
- The legal obligations of the building owners to ensure egress facilities are provided for people with disability.

Number of Injuries and Fatalities

There is no available evidence to suggest that the problem is leading to injury or fatality of building occupants living with disability. Although incidences of injury or fatality are known to occur within the built environment, available data suggests, private dwellings are where they predominately occur⁷.

⁶ Warrington Fire Research Emergency Egress for People with Disabilities 2009

⁷ NCIS Fact Sheet: Deaths in the home (Australia 2003-2007)

In May 2014, the ABCB Office commissioned the National Coronial Information Systems Database (NCIS) to report on the number of fatalities that have occurred in non-residential buildings over the last five years. The results indicate a total of three fatalities have occurred, of which, none were people living with disability⁸.

Consultation Question:

- Are you aware of an injuries or fatalities that have occurred in a non-residential building that was a result of a person with disability being unable to successfully evacuate?

Current Management Practice

Obligations for building evacuation management are contained in Work Health and Safety Regulations (2011) and similar instruments apply in each State and Territory. These contain the duty to prepare and maintain an emergency plan in the workplace. This is the legislative basis to establish procedures for an effective response to an emergency, medical treatment and assistance, and communication between the responsible workplace representatives and all persons at the workplace. AS 3745 Planning for Emergencies in Facilities includes guidance on developing evacuation plans for people with disability and assists in addressing the needs of people with disability.

Preparing evacuations plans for people with disability is highly complex and dependent on the occupant's type of disability, the building with which the emergency event is occurring, the nature of the emergency event and the capability and availability of trained personnel to assist in evacuation.

Although there could be complications with planning for evacuations for people with disability, the ABCB is unaware of any evidence to suggest people with disability are being evacuated in an unsafe or undignified manner.

Consultation Question:

- Are you aware of any situations where a person with disability has been evacuated in an unsafe and/or undignified manner during an emergency event?

Human Behaviour in Emergency Events

While providing safe means of escape remains fundamental to fire and building safety, human behaviour in an emergency is also an important factor. Given the information available, emergency evacuations have shown that most behaviour is both reasonable, rational, and is often heroic and altruistic. Most people will stop and help others in dangerous situations and take cues from others to understand the situation. Familiarity with the exit also contributes to the chosen egress point and studies have found that people tend to egress where they have entered the building⁹. The behaviour of occupants to help others and seek the assistance of trained occupants are highly desirable and

⁸ NCIS (2014) Fatalities Resulting from Emergency Events in Non-Residential Buildings

⁹ Levin, M. B. 1984 Human Behaviour in Fire: What We Know Society of Fire Protection Engineers

effective, however, assistance is sometimes not available. It is in the scenario where assistance by others is unavailable the problem is most pronounced.

Legislative Requirements

Both life safety and the avoidance of discrimination of people with disability within society are basic human rights that are reflected in international and federal legislative instruments. The two legislative instruments that are relevant to providing provision for emergency egress for people with disability are the Disability Discrimination Act (1992) and the United Nations (UN) Convention on the Rights of People with Disability. Both instruments are intended to ensure that the basic human rights of people with disability are met.

The Disability Discrimination Act 1992 (DDA)

The Disability Discrimination Act 1992 (Cth) prohibits discrimination against people with disability in the provision of access to premises¹⁰. The DDA aims to influence community attitudes and behaviour through its objectives and the setting of a series of standards, including:

- to eliminate as far as possible, discrimination against persons on the basis of their disability in a range of areas including public transport, employment, education, accommodation and premises used by the public;
- to ensure that as far as practicable, persons with disability have the same rights before the law as the rest of the community; and
- to promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community.

The DDA recognises that providing access for people with disability does not mean access at any cost. The use of terms such as “as far as possible” and “as far as practicable” makes it clear that there must be a balance between the benefit and costs of providing access¹¹. In the case of access, prescription was necessary to manage this balance through the development of the Disability (Access to Premises) Standards due to the pervasiveness of the problem and uncertainty arising from the general obligations. However, the Act is generally enforced primarily through a complaints mechanism, which allows individuals who believe that they have experienced unlawful discrimination to seek a conciliated outcome through the Australian Human Rights Commission and, if that is not successful, to bring an action in the Federal Magistrates Court or the Federal Court of Australia¹².

The ABCB is aware of three cases where complaints relating to the equity of building provisions to enable emergency egress have been the subject of complaint under the DDA. The cases involved

¹⁰ Section 23, Disability Discrimination Act 1992 (Cth). Hereafter ‘Disability Discrimination Act’.

¹¹ Department of Broadband, Communications and the Digital Economy (2014) Regulation Impact Statement-Media Access Review, page 6

¹² Human Rights and Equal Opportunity Commission, Federal Discrimination Law (2008), pp. 259–260.

hearing impaired occupants being unable to hear aural warning cues. All cases resulted in visual alarms being provided for hearing impaired occupants¹³¹⁴.

Despite these examples the extent of complaints activity in relation to emergency egress has been low. Although this could be a reflection of the number of emergency events occurring, several other factors may contribute to the number of complaints.

These factors include:

- The degree of compliance with the general duties of the DDA in relation to premises is low¹⁵.
- There is no direct incentive for building owners and designers to ensure they are in compliance.
- The costs involved in resolving complaints are substantial (ranging between \$5,000-\$40,000).
- Limited resources of complainants mean that relatively few complaints will be carried through from the AHRC conciliation process to the court system.
- The risk and burden of losing a compliant once lodged can be enough to discourage action.
- As access to buildings continues to increase as a proportion of building stock, complaints may increase due to the occasional nature of egress.

The extent to which these other factors influence the number of complaints is uncertain. It should be noted however, that in the absence of clarity of compliance obligations – or the existence of current reviews aimed at determining the obligations – the continuation of the existing complaints-based system would probably involve a higher level of complaints activity than has been observed to date.

United Nations Convention on the Rights of People with Disability

Australia has international obligations under the UN Convention on the Rights of People with Disability. Australia ratified the Convention in 2008 in effort to promote the equal and active participation of all people with disability. In 2009, Australia became a party to the Optional Protocol to the Convention. This sets out with clarity the obligations on countries to promote, protect and ensure the rights of people with disability, and specifically prohibits discrimination against people with disability in all areas of life.

The principles of the present Convention are:

1. Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons;
2. Non-discrimination;
3. Full and effective participation and inclusion in society;

¹³ Human Rights Commission, accessed 14 April 2014 > [DDA Conciliation - Goods, Services and Facilities](#) <

¹⁴ Human Rights Commission, accessed 14 April 2014 > [DDA Conciliation - Access to Premises](#) <

¹⁵ Final Regulation Impact Statement (2009) *Proposal to Formulate Disability (Access to Premises – Buildings) Standards and Amend the Access Provisions of the Building Code of Australia*

4. Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity;
5. Equality of opportunity;
6. Accessibility;
7. Equality between men and women;
8. Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities.

Article 11 of the Convention sets out the obligations of countries to ensure that people with disability can exercise the right to egress in an emergency and States Parties must take “all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including situations humanitarian emergencies and the occurrence of natural disasters.”

Australia’s obligation under the Optional Protocol to the Convention allows individuals who feel that their rights under the Convention have been breached to make a complaint to the UN Committee.

In September 2013, the Committee responsible for dealing with complaints identified significant short coming relating to all Australians with disability¹⁶. In response to the obligations under Article 11 the Committee noted concern that there were as yet no specific measures in national plans to address emergency intervention strategies for people with disability. Subsequently, the Committee recommended that all levels of government implement emergency management standards that include provision for preparation, early warning and evacuation of people with disability in emergency events¹⁷.

Disability Discrimination and Emergency Egress

Every Australian has the right to feel confident that they will be able to evacuate from a building in a safe and independent manner should the need arise as a result of an emergency event. The knowledge that facilities are provided as a means of egress for the able-bodied population means this expectation is met and not necessarily a consideration for the majority of occupants when occupying a building.

The extent to which a lack of emergency egress facilities that enable a dignified and independent means of exiting a building affects people with disability occupying buildings is unknown. It is likely however to contribute to the problem.

¹⁶ Irvine, S “UN: Australia is not meeting human rights obligations to First People with Disability”, accessed 16 August 2014 > [Irvine article](#) <

¹⁷ CRPD: Concluding observations on the initial report of Australia, adopted by the Committee at its tenth session(2-13 September 2013), accessed 16 August 2014 > [CRPD Concluding observations](#) <

Consultation Questions:

- To what extent do you believe lack of emergency egress facilities affects people with disability occupying buildings?
- Is there any literature or research to support your answer?
- Are you aware of any complaints lodged to building owners, local, state or federal government departments in regards to emergency egress facilities?

Frequency of Emergency Events

Whilst Australia has experienced a number of major building related emergencies in the past 50 years, emergency events in buildings, especially in non-residential buildings are rare in Australia.

Fatalities as a result of historical emergency events in Australia have primarily been in private residences¹⁸ caused by fire events. In many cases evacuation of commercial buildings occur much earlier when there is greater time to evacuate larger volumes of occupants. Generally, there is no personal attachment to a commercial building and occupants are more likely to leave early rather than to stay and defend in the situation of a private home.

Five Emergency Egress Scenarios

Where data is difficult to obtain the problem can be described by examining the characteristics of the situation- in this case describing how people with disability might egress in the event of emergency.

In describing the problem the RIS presents five scenarios of emergency egress that match the five proposed solutions. It should be noted that the extent to which the problem associated with each proposal influences the rate of fatality in buildings is unknown.

Each scenario is constructed on the basis of people with a particular disability in a particular situation, without assistance.

Scenario 1 – Sounding alarms in public spaces

The problem for some hearing impaired occupants, predominantly the profoundly hearing impaired, in the public spaces of buildings, is that a sounding alarm (if triggered) will not be heard and so these occupants will not be notified of an emergency event.

The BCA, through referenced technical standards includes requirements for alerting occupants to emergency situations. These rely on audial signals produced by sounders or amplified sound systems which, depending on their location are required to be 10 decibels (dB) higher than ambient noise levels and not less than 65dB in sole-occupancy units¹⁹ and up to 100dB(A) where building occupant

¹⁸ AFAC (1998) “ Fire Fatalities: ‘Who’s at risk’ Research Report, p87.

¹⁹ Clause 3.22 Australian Standard 1670-.1 2004 Fire Detection Warning Control and Intercom Systems: Design, Installation and Commissioning.

warning is required in public areas²⁰. The use of other warning signals such as visual and tactile signals is not mandatory unless where the specific installation requires background noise greater than 95dBA to be overcome. For occupants with a hearing impairment these auditory cues may be insufficient to alert occupants of a hazard, delaying egress time.

According to data from the Australian Bureau of Statistics (ABS), about 2.67 million Australians—one in every eight people—have some form of hearing loss²¹. Hearing loss is projected to reach five million Australians by 2020²².

Although hearing loss is prominent in Australia, research suggests some hearing impaired people are likely to recognise audio warning cues. The likelihood a person recognises an audio warning cue is dependent on the severity of impairment. Hearing impairment is classified across four categories and is shown in Table 1.

Table 1: Hearing impairment by category

Impairment	Hearing Loss (dB)	Proportion (%)
Mild	21 – 40	84%
Moderate	41 – 60	13%
Severe	61 – 90	3%
Profound	91+	3%

The consequences of impairment in the mild and moderate categories are increasing difficulty in comprehending speech. In the severe and profound categories the consequences also include being unable to hear normal speech.

The World Health Organisation describes²³:

- Mild hearing impairment as “able to hear and repeat words spoken in normal voice at one metre”.
- Moderate hearing impairment as “able to hear and repeat words using raised voice at one metre”.
- Severe hearing impairment as “able to hear some words when shouted into the better ear”.
- Profound hearing impairment as “unable to hear or understand even a shouted voice”.

Evidence from the literature is clear that auditory alarms can be effective for people with a hearing loss of up to 70dB while they are awake. This result includes people in the mild and moderate categories.

The frequency of a sounding alarm lies within the audible range of conversation: 3,100Hz compared with the range of conversation of 500 – 4,000Hz. People who can hear a conversation will therefore

²⁰ Spec E2.2a Clause 6, NCC Volume One 2014

²¹ Australian Bureau of Statistics, 2007-08 National Health Survey, ABS cat. No.4364.0, ABS, Canberra, 2009, page 15.

²² Access Economics, Listen Hear! The Economic Impact and Cost of Hearing Loss in Australia, Report prepared for the Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation and the Victorian Deaf Society, Melbourne, 2006, page 39.

²³ World Health Organisation

hear a sounding alarm. Hence people with a mild or moderate hearing loss should be able to hear a sounding alarm; people with a severe or profound impairment will not necessarily hear a sounding alarm.

Two studies have indicated the number of people with a hearing loss of more than 65dB – people with severe and profound impairment – to comprise 80,100 people or 0.3% of the Australian population (or 3% of all people with hearing impairment²⁴). Hence 0.3% of Australians will not hear a sounding alarm in the event of an emergency.

Consultation Questions:

- Have you been unable or found it difficult to hear a sounding alarm in an emergency situation?
- If yes, were you notified of the emergency in an unsafe and/or undignified manner?

Please explain your answers.

Scenario 2 – Sounding alarms when occupants are asleep

The problem for some hearing impaired occupants, including the profoundly hearing impaired, is that when occupying a publicly accessible room in a Class 1b and Class 3 building (e.g. hotel), and asleep, a sounding alarm will not be suitable to arouse these occupants to respond to an emergency event.

In the event of an emergency, hearing impaired occupants are at greater risk of not being notified of the event due to the inability of the alarm to alert the occupant. There are two known fatalities in Australia that have occurred as a result of hearing impaired occupants not being notified of a signaling alarm^{25,26}. These fatalities occurred in private residences where they were alone and asleep.

The responsiveness of people with disability to a sounding alarm, when asleep, has been tested in a study on 120 people who were asleep.²⁷ Smoke detectors were positioned seven feet from the floor of the room and ten to thirteen feet away from the head of the bed on the opposite wall, sounding at 85dB. The study found that the audible smoke detector signal was 92% effective across all sleep stages for the hearing able population, 57% effective for the hard of hearing and 0% effective for deaf persons.

The study shows that 1,148,100 people or 5% of the Australian population (or 43% of hearing impaired people) would not hear a sounding alarm when asleep.²⁸

²⁴ Centre for Population Studies (1998) and Access Economics: The Economic Impact and Cost of Hearing Loss in Australia (2006).

²⁵ Deaf Australia (2003) How many deaf have to die?

²⁶ ABC News (2008) One dead as blaze destroys house

²⁷ Roby Smoke detector alert for the deaf

²⁸ The proportion of deaf people is unknown but would be too small to affect this calculated percentage; severe and profoundly hearing impaired people comprise 3% of all people with hearing loss.

In an emergency event 1.2% of Australians who are asleep in a hotel or other Class 3 building would not hear a sounding alarm and would be at risk from the emergency if they were the only occupants of the room at the time.

Consultation Questions:

- Have you been unable or found it difficult to hear a sounding alarm in an emergency situation while asleep?
- If yes, were you notified of the emergency in an unsafe and/or undignified manner?

Please explain your answers.

Scenario 3 – Retracing steps to point of entry

In an emergency, if visually impaired occupants are unable to detect the exit signs in a building, they may respond by retracing their steps via an access way to their point of entry. If the entry point is a lift, and the lift is not designed for use during an emergency event, and there are no fire-isolated stairs close to the lift, then visually impaired people will be unable to evacuate the building.

Occupants with disability are often reliant on routes with accessible features to gain access to buildings. Often the chosen point of access is familiar and suitable for use due to the requirements of AS1428.1- Design for access and mobility.

As previously discussed, human behavior in emergency events show that occupants will tend to exit via where they entered the building. This is particularly the case for people with vision impairment. Way finding techniques are a common and effective method of independently negotiating the built environment.

A study conducted in 1996 suggests there are three main variables in an occupant's choice of exit when there is an emergency event- familiarity with the exit, distance to the exit, and whether the door is open or closed²⁹. The study demonstrates the preference of 17 occupants based on the three variables in deciding which exit to choose in the event of an emergency. The results are shown in Table 2.

²⁹ Benthorn L, Frantzich H. 1996. Fire alarm in a public building: How do people evaluate information and choose evacuation exit?

Table 2: Occupant preference in exiting buildings

Condition		Chosen	
Emergency Exit	Distance to Familiar Exit	Familiar Exit	Emergency Exit
Closed	Short	13	9
Open	Short	9	7
Closed	Long	10	7
Open	Long	1	15

Source: Department of fire safety engineering, Lund University 1996

The findings of the study conclude that most of the occupants preferred to exit via familiar exits even when the distance was double compared to the emergency exit. The only exception is when the emergency exit is open.

Although no empirical data exists, anecdotally, familiarity of the exit would have greater importance to a person with disability.

The problem in this scenario is where the point of access is no longer suitable for use due to a hazard. In this scenario the emergency egress point may be some distance from the original entrance point delaying the time taken to find a suitable means of evacuation.

Vision impaired people who require the use of an aid comprise 230,000 or 1% of the Australian population, with 0.07% of the Australian population reported to be completely blind. People with vision impairment are projected to reach 716,000 by 2020³⁰.

Visual acuity can be described for the mild, moderate, severe, profound categories of disability, and for near blindness; total blindness does not permit any visual acuity. Table 3 describes the categories of visual disability by severity.

Table 3: Visual acuity by visual disability category

Category	Reading Ability	Skills for Orientation and Mobility
Mild (near normal)	Normal reading speed, reduced reading distance	Normal performance in orientation and mobility; occasionally surprised by events on the side
Moderate low vision	Near normal with reading aids	Near normal performance; requires scanning for obstacles
Severe low vision	Slower than normal with reading aids	Visual mobility is slower than normal; requires continuous scanning; may use cane as adjunct
Profound low vision	Marginal with aids	Must use long cane for detection of obstacles; may use vision as adjunct for identification
Near blindness	No visual reading	Visual orientation unreliable; must rely on long cane, sound, guide dog

Source: Colenbrander A, *Measuring vision and vision loss*, chapter 51 in Duane's (2001) *Clinical Ophthalmology*

³⁰ Access Economics, *Clear Insight: The Economic Impact and Cost of Vision Loss in Australia*, Report prepared for the Centre for Eye Research Australia and the Eye Research Foundation, Canberra, 2004, page 31.

This information indicates that people with mild and moderate low vision would detect exits and exit signs. A person with severe low vision may also detect an exit. If the person uses continuous scanning, this takes time to allow for slower visual acuity. Persons with profound low vision or near blindness would not visually identify an exit.

Data from a Victorian study in 2004³¹ shows 10% of people with vision impairment had low vision that was severe or greater. On the basis of this data, 23,000 or 0.10% of Australians would have difficulty detecting an exit in an emergency.

Consultation Questions:

- Have you been unable or found it difficult to find a safe evacuation point in an emergency situation?
- If yes, were you assisted in an unsafe and/or undignified manner?

Please explain your answers.

Scenario 4 – Egress paths to and from exits

For persons with mobility impairment, exits not designed as access-ways may result in the inability to reach the exit in an emergency. This may cause instances where evacuation of people with disability is undignified.

In buildings with greater floor area and multiple exits, an access-way from the point of entry may not be appropriately separated from the effects of fire in the event of an emergency and people with a mobility disability could be injured or impeded in their ability to reach the exit. In an emergency this could pose a risk to life. This situation - a lack of access-ways to exits - would be a problem, and human intervention would be required to assist those people with disability evacuating the building. The extent to which that intervention would cause undignified egress is unknown.

There are 630,000 mobility impaired people or 3% of the Australian population who require the use of aids to carry out day to day activities³².

Not all people with mobility aids will be able to negotiate paths of travel to an exit, particularly where non-fire-isolated stairs are used. People with larger mobility aids, such as wheelchairs or walking frames, will not be able to independently egress. Nonetheless, the ability to reach an exit will facilitate assistance in due course, and assist in the evacuation process.

³¹ Hugh R Taylor, Jill E Keeffe, Hien T V Vu, Jie Jin Wang, Elena Rohtchina, Paul Mitchell and M Lynne Pezzullo. 2005. Vision Loss in Australia.

³² ABS Category 4446.0 Table 4 Disability Aids

Consultation Questions:

- Have you been unable or found it difficult to reach a safe evacuation point in an emergency situation?
- If yes, were you assisted in an unsafe and/or undignified manner?

Please explain your answers.

Scenario 5 – Emergency egress using fire-isolated stairs

For occupants with a visual impairment the lack of accessible features such as tactile indicators at the commencement of a fire-isolated stair ahead, or open risers in stairs creates a risk of injury due to a lack of predictability in the built environment.

For people with mobility impairment, lack of a second handrail could create problems in using fire-isolated stairs.

Current requirements for fire-isolated stairs and ramps do not require full compliance with the requirements of AS 1428.1.

Currently the BCA requires fire-isolated stairs to have one handrail on the inside that is continuous. The stair dimensions must conform to the normal BCA specifications for the risings and goings of stairs. Currently the inside handrail will be helpful for some occupants while evacuating. It could, however, be insufficient for people with a dexterity impairment who are unable to grasp an inside handrail.

Tactile Ground Surface Indicators (TGSIs) are recognized as very effective in identifying hazards for the visually impaired population. Not applying these visual and tactile cues in fire-isolated stairs and ramps may pose a risk in the event of an emergency to visually impaired occupants who, due to the unpredictability or inconsistency of TGS application, may not be able to identify change in direction or slope when evacuating. Similarly the use of open risers in fire-isolated stairs has the potential to create difficulties for these occupants in negotiating stairs unassisted.

Consultation Questions:

- Have you been unable or found it difficult to egress from fire-isolated exits?
- If yes, were you assisted in an unsafe and/or undignified manner?
- Are the scenarios described sufficient to describe the risks faced by occupants with disability?
- Can you provide empirical evidence on the extent of each problem described by each scenario?
- Are there any cases of litigation or complaints or other impacts you are aware of as a result of the scenarios occurring?

International Comparisons

Two comparative studies³³³⁴ of international regulations have been conducted to determine the approaches and methodologies in other jurisdictions in relation to provisions for emergency egress for people with disability.

The following findings were reported:

National Fire Code of Canada:

The National Building Code of Canada does not address emergency egress for people with disability, instead it is considered in the National Fire Code via a functional statement which states ‘that the emergency procedures to be used in case of fire shall include provisions for evacuating occupants, including special provisions for persons requiring assistance.

Hong Kong:

The Hong Kong Code of Practice for Fire Safety in Buildings is a performance-based code, and the prescriptive part requires a refuge floor on every 20 storeys or 25 storeys depending on the building use. The refuge floor requirement does not apply to domestic buildings or composite buildings not exceeding 40 storeys in height above the lowest ground storey. The code also requires that such buildings be served by a fireman’s lift to facilitate rescue assistance. These requirements have also been adopted in other areas of China and in some Asian countries.

Sweden Building Regulations BBR:

Sweden does not have specific prescriptive requirements for emergency egress for occupants with disability. Their means of describing obligations for emergency egress for all occupants is through a functional statement.

Norwegian Building Regulations:

Norway does not address emergency evacuations for people with disability on the basis that persons with disability are more aware of their situation and are likely to be assisted by other occupants and rescue services.

³³ Warrington Fire Research Emergency Egress for People with Disabilities 2009

³⁴ ABCB Handbook 2013- Lifts Used During Evacuation

Building Standard Law of Japan

Japanese building regulations do not contain prescriptive requirements for emergency egress for people with disability. Provisions for egress of people with disability are presented in emergency evacuation management plans for individual buildings and these plans are submitted to fire service authorities for approval.

United Kingdom Building Regulations

The United Kingdom has a performance-based code that applies in England and Wales and Approved Documents which contain approved building solutions. Approved Document B Volume 2 (2006) deals with Fire Safety in buildings other than dwelling houses. Performance requirement B1 is generic i.e. it does not differentiate between ambulant people and people with disability. Only a guidance note to the requirement identifies potential issues relating to emergency egress for people with disability.

Approved Document B requires that buildings in excess of 30m high be designed for phased evacuation and that stair capacity be based on one exit stairway being discounted due to use by emergency personnel. Arrangements are to be determined in consultation with the fire service. An additional requirement is that these buildings be equipped with a fire-fighting shaft including a protected lift dedicated to emergency response service.

Approved Document M addresses access and use of facilities in buildings by people with disability; however it does not specifically address egress by people with disability.

UK legislation requires employers to implement effective arrangements for access and emergency evacuation for employees and visitors. Part of the requirement is the completion of a PEEP for people with disability. The PEEP addresses the safety of a specific individual and records the safety plan, including evacuation routes, corridors, stairs or refuges etc. It also identifies people who will assist the individual and their training or practice needs. It proposes the use of emergency lifts and safe refuges that are protected from fire.

In public places UK workplace legislation proposes that employers, when conducting a fire risk assessment and considering the means of escape from a fire, incorporate the recommendations of the British Standards Institute BS 9999: 2008 – ‘Fire safety code of practice for the design, management, and use of buildings’. This document specifies what is required in relation to building design, lift design and building management responsibilities and procedures including providing information on improving accessibility for people with disability in fire safety design and management plans.

International Building Code

The International Building Code has specific provisions for ‘accessible means of egress’. The provisions require accessible spaces within a building to be provided with at least one accessible means of egress.

The specific provisions include requirements for accessible means of egress to be continuous to a public way, or an exterior assisted rescue area provided. Four buildings more than four stories high at least one accessible means of egress must be via a lift and refuge areas refuge areas directly

connected to a stair or lift and provided with communication and evacuation details. Tactile indicators are required at the doorway of a refuge area.

Generally the level of provisions from these countries is comparable with Australia's existing access provisions and the performance based functional requirements for emergency egress.

Objectives

The Objective in addressing the problem of emergency egress for people with disability relates to the safety of these occupants in new Class 1b 2, 3, 4, 5, 6, 7, 8 and 9 buildings.

- To ensure an appropriate level of safety in new buildings for occupants with disability.
- To ensure that the National Construction Code reflects the obligations expressed under the Disability Discrimination Act and international obligations with respect to dignity, equality and independence.

Options

There are three options including the option of retaining the status-quo presented for consideration. These options are as follows:

The Status Quo

The status quo will be regarded as a baseline from which the incremental impacts of the proposals and alternative option will be assessed.

Where the incremental impacts of other options would result in more costs than benefits, or would be ineffective in addressing the problem or achieving the objectives, the RIS will conclude in favour of retaining the status quo.

Option 1

- To include into the National Construction Code, enhanced emergency egress provisions for people with disability.

This Option involves including five proposals developed in collaboration with the disability sector in the deemed-to-satisfy provisions of the BCA. The proposals are listed below.

Proposal 1 - Visual Alarms

This proposal requires visual alarms to be provided where automatic smoke detection and alarm systems are required in accessible areas of buildings.

The proposed changes are intended to assist those with a hearing impairment to receive adequate warning at the same time as other occupants in areas that require notification and coordination of egress for sound system and intercom systems such as public areas.

Proposal 2 - Tactile Alarms

This proposal requires tactile alarms – pillow shakers to be provided in all bedrooms of Class 1b buildings and all accessible SOUs of Class 3 buildings.

A subset of this Option is providing tactile alarms in all residential areas of Class 1b and Class 3 buildings. This has been costed in the impact analysis on the basis that people with hearing impairment may not have any other physical disability and can occupy any sleeping area.

The proposed changes are intended to provide adequate warning to those occupants with a hearing impairment who are asleep and require notification of an emergency event.

Proposal 3 – Co-location of Fire-isolated Exit with Lifts

This proposal requires one fire-isolated exit to be within 6 metres of a lift or each bank of lifts.

The proposed changes are intended to improve the opportunity for visually impaired occupants who rely on way-finding techniques to locate and use suitable exits in an emergency.

Proposal 4 - Egress Paths to and from an Exit

This proposal requires the paths of travel to a place of safety to be accessible for use by people with disability. The egress paths must be designed as accessways with features which satisfy the requirements of AS1428.1.

The path from an exit to a 'safe place' (as defined by the NCC) must also comply as an access-way.

The proposed changes are intended to provide suitable pathways to exits for people with disability and allow for dignified and independent egress.

Proposal 5 - Accessibility of Fire-isolated Exits

Fire-isolated exits are required to include accessible features in accordance with AS 1428.1. This includes but is not limited to:

- a) an additional handrail
- b) Tactile Ground Surface Indicators (TGSIs) at the commencement of fire-isolated stairs or ramps.
- c) Limitations on door opening forces
- d) Luminance contrast between doorways and door frames.

External stairways used in lieu of fire-isolated stairways require accessibility features, particularly:

- a) an additional handrail
- b) TGSIs.

The proposed changes are intended to allow for dignified and independent egress from suitable exits in the event of an emergency.

Option 2

- To develop a non-regulatory handbook

This Option involves the ABCB developing a non-regulatory handbook that would provide suitable guidance for industry to incorporate emergency egress provision for people with disability. The ABCB

Office, in collaboration with the jurisdictions, disability sector and industry experts, has developed a set of technical building solutions that address the problem of emergency egress for people with disability. Under this option these technical building solutions would be released as a handbook for reference and use on a case-by-case basis by State, Territory and Local Governments and the building industry.

Consultation Question:

- Are there alternative cost-effective measures that could be implemented?

Impact Analysis

This section provides an assessment of the incremental costs and benefits of the Options 1 and 2, compared with the status quo baseline.

Number of Buildings

The number of building approvals each year is not collected nationally. Victoria previously collected data on the number of approvals issued each year. It is known through ABS comparisons that Victoria accounts for approximately 25% of all building activity occurring annually. This has been verified in the following ways:

- Value of non-residential work completed 2003-2013 account for 24.7% of all activity
 - Catalogue 8752.0 Tables 71 and 72.
- The number of other residential units completed 2003-2013 account for 25.9% of all activity.
 - Catalogue 8752.0 Tables 37 and 39

The expected number of new buildings approved annually is shown in Table 4.

Table 4: Number of new buildings approved in Australia annually

Building Class	Number
Class 1b	200
Class 2	2,546
Class 3	181
Class 5	2,631
Class 6	1,473
Class 7a	335
Class 7b	2,219
Class 8	1,292
Class 9a	181
Class 9b	1,908

Option 1

The costs associated with this option are categorised by both proposal and building classification. In order to meet the Objective it is assumed all proposals are required to be implemented. It should be noted however that if one or more of the proposals identified in the RIS were employed, it would go some way to addressing the problem, including the issue of equity and independence.

The five proposals are intended to apply to areas required to be accessible as described by Table D3.1 of NCC Volume One, and do not apply to all building classes. The proposal to provide supplementary tactile alarms with audial warning cues only apply to accessible dwellings in residential parts of Class 1b and Class 3 buildings. The proposal to supplement audial warning cues with visual alarms applies to public areas of all classes except Class 1b buildings. The other three proposals apply to all building classifications.

Costs

The costs of the proposals are informed by two reports:

- Design and Cost Implications for the Provision of Occupant Warning for Hearing Disabilities- ORR Partners May 2014 looking at the typical systems used to alert the hearing impaired and their relative cost of the systems.
 - Informs the visual and tactile alarm proposals.
- Proposed Amendments to Deemed to Satisfy Provisions BCA 2014- Emergency Egress Cost Implications Study- RLB June 2014, who used their industry knowledge and experience to provide an analysis of the cost implications of the 5 proposals using typical (generic) examples of the range of representative building classes. A disaggregated cost matrix by building class and proposal is included in Appendix A.
 - Informs all proposals.

Proposals 1 & 2

Visual Alarms

Visual alarms were costed by RLB in two parts using costs and configurations provided in the ORR Partners report. Costs were developed by applying common configurations for visual and tactile alarms that would be given effect through amendments to the current NCC referenced document AS 1670.1 to require –

- visual and tactile alarms be installed in accordance with AS 1603.17 “Automatic fire detection and alarm system, warning equipment for people with hearing impairment”; in accessible sole-occupancy parts of Class 1b and 3 buildings; and
- visual alarm devices supplement audial warnings in AS 1670.1 “Fire detection, warning, control, and intercom systems- System design, installation and commissioning— Fire” in accessible public areas in other classes.

The cost to install VADs to accessible public areas in representative building classes are shown in Table 5.

Table 5: Costs of installing visual alarm devices in accessible common areas per building classification

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$3,200	2,546	\$8,147,200	\$61,228,100
Class 3	\$2,700	181	\$488,700	\$3,672,694
Class 5	\$94,667	2,631	\$249,068,887	\$1,871,810,532
Class 6	\$34,250	1,473	\$50,450,250	\$379,145,346
Class 7a	\$10,400	335	\$3,484,000	\$26,183,069
Class 7b	\$50,900	2,219	\$112,947,100	\$848,823,688
Class 8	\$2,500	1,292	\$3,230,000	\$24,274,200
Class 9a	\$18,600	181	\$3,366,600	\$25,300,781
Class 9b	\$45,000	1,908	\$85,860,000	\$645,257,841
Total Cost			\$517,042,737	\$3,885,696,251

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with costs of this proposal are:

- Visual alarm devices can be installed as part of the building smoke detection system.
- Approximate coverage of a visual alarm device is 28m² to areas where small coverage is required e.g. small rooms, and 90m² to larger open areas e.g. warehouses.
- Allowance has been made for additional circuitry for each VAD from all accessible areas to the existing addressable system. An allowance of 10m per VAD has been allowed.

Visual and Tactile Alarms

Under this proposal, visual and tactile alarms will be required to be installed in all accessible SOU parts of Class 1b and Class 3 buildings.

The midpoint cost of installing VADs and tactile alarms in each representative building are shown in Table 6.

Table 6: Cost of installing tactile and visual alarms to the accessible sole-occupancy units in Class 1b & 3 buildings

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 1b	\$3,300	200	\$660,000	\$4,960,053
Class 3	\$3,500	181	\$633,500	\$4,760,900
Total Cost			\$1,293,500	\$9,720,953

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with the costs of this proposal are:

- Visual alarm devices are installed in each SOU as required and can be installed as part of the building smoke detection system in Class 3 buildings.

- Pillow shakers are installed in each bedroom and meet the requirements of AS1603.17.

As previously discussed, a subset of this option has been costed that extends the proposal to all SOUs of Class 1b and Class 3 buildings. The cost of installing VADs and tactile alarms in each representative building are shown in Table 7.

Table 7: Cost of installing tactile and visual alarms to all sole-occupancy units in Class 1b & 3 buildings

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 1b	\$3,300	200	\$660,000	\$4,960,053
Class 3	\$133,700	181	\$24,199,700	\$181,866,366
Total Cost			\$24,859,700	\$186,826,419

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value

Consultation Question:

- Should visual and tactile alarms be installed in all residential areas of Class 3 buildings or only those required to be accessible?

Proposal 3

Co-location of Stairways with Lifts

Under this proposal, all accessible lifts would be required to be located within 6 metres of a fire-isolated exit. RLB analysis suggest that the proposal is generally industry practice, except buildings with large floor plates where additional fire-isolated exits may need to be considered and in high rise office buildings where additional banks of lifts are required to carry occupants to the upper storeys.

RLB consider where that the additional cost of co-locating lifts with fire-isolated exits may be an issue in Class 5 and Class 6 buildings. The analysis in Table 8 is indicative of costs however, these were considered avoidable in all but the minority of cases. At the time of this Consultation RIS no data was available to determine what percentage of Class 5 and Class 6 buildings were likely to be affected. As such the costs are reported on a per unit basis and have not been included in the total costs of the proposals. These costs are unlikely to significantly impact the Present Value of all proposals.

Table 8: Cost of co-locating lifts with fire-isolated exits.

Building Class	Cost
Class 5	\$6,333
Class 6	\$5,850

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with costs of this proposal are:

- The primary costs are the additional hours for design. Design fees have been included at \$200 per hour and an allowance of a period of 16 hours has been assumed.
- In the Class 5 building, 1 lift has been assumed to require relocation to meet the proposal.
- In the Class 6 building, 4 lifts have been assumed to require relocation to meet the proposal.

Proposal 4

Accessible Egress Paths to and from an Exit

Under this proposal, all paths of travel to and from and exit will be required to comply as an accessway in accordance with AS 1428.1. This includes the point of discharge from an exit to open space.

RLB considered the costs in two parts. Firstly they considered the incremental cost of providing accessible paths of travel to an exit within the generic buildings. The costs associated with this part of the proposal are shown in Table 9.

Secondly, RLB considered the incremental cost of providing accessible paths of travel to open space once discharged from an exit. RLB found that while there may be significant costs associated with the installation of an accessway, these could be accounted for through thoughtful design of exits. RLB based their calculations on the assumption that a path provided that did not include a step bollard or similar would not require additional enhancement to facilitate safe egress once discharged from the building.

Table 9: Cost of providing accessible paths to and from exit points

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$6,450	2,546	\$16,421,700	\$123,412,889
Class 3	\$4,233	181	\$766,172	\$5,757,968
Class 5	\$4,467	2,631	\$11,752,677	\$88,324,097
Class 6	\$16,700	1,473	\$24,599,100	\$184,867,950
Class 7a	\$1,600	335	\$536,000	\$4,028,164
Class 7b	\$24,000	2,219	\$53,256,000	\$400,231,209
Class 8	\$1,600	1,292	\$2,067,200	\$15,535,488
Class 9a	\$2,500	181	\$452,500	\$3,400,643
Class 9b	\$8,680	1,908	\$16,561,440	\$124,463,068
Total Cost			\$126,412,790	\$950,021,476

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with this proposal include:

- Where applicable, inclusion for the installation of threshold and step ramps at each point of egress and at differences in level.
- Where there is a ramp or threshold installation included in a 3 storey accommodation with no lift property type, it is assumed these installations are deemed-to-satisfy the provisions.

Proposal 5

Accessibility of Fire-isolated Exits

Under this proposal, all fire-isolated exits will be required to include accessible features in accordance with the requirements of AS1428.1. Costs associated with this proposal primarily relate to the additional requirements for landings, handrails and Tactile Ground Surface Indicators (TGSIs). The analysis by RLB also considers the effects of a minimum setback of 900mm from the property boundary, luminance contrast of surfaces and door controls. Costs associated with this proposal are shown in Table 10.

Table 10: Cost of providing accessible fire-isolated exits

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$241,000	2,546	\$613,586,000	\$4,611,241,295
Class 3	\$109,467	181	\$19,813,527	\$148,903,257
Class 5	\$69,167	2,631	\$181,978,377	\$1,367,609,467
Class 6	\$51,200	1,473	\$75,417,600	\$556,780,780
Class 7a	\$51,500	335	\$17,252,500	\$129,656,544
Class 7b	\$8,700	2,219	\$19,305,300	\$145,083,813
Class 9a	\$30,500	181	\$5,520,500	\$41,487,840
Class 9b	\$38,820	1,908	\$74,068,560	\$556,642,431
Total Cost			\$1,006,942,364	\$7,567,405,727

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with this proposal include:

- A rate of \$200 per metre has been included for the additional handrail to each flight of stairs. This includes the material cost of the component at \$110 per metre and \$90 per metre for additional labour.
- It has been assumed that currently designed handrails do not include for the handrail to either turn to 180° returns to the end post of the wall to each handrail. Allowance of \$200 per return has been made and includes the steel component, additional fixings and labour.
- The installation of Tactile Ground Indicators (TGSIs) has been allowed for in all fire-isolated stairs in accordance with AS1428.1 where applicable.
- Painting of the surfaces will be sufficient in reaching the required luminance contrast between doors and surrounding surfaces.

Total Cost of Proposals

The total cost of the proposals is shown in Table 11. The costs of all proposals significantly impact Class 2 and Class 5 buildings where proposals 1 and 5 are the predominate costs incurred across all building classes.

Table 11: Total cost of proposals

Building Class	Total Cost of Proposals	Present Value Cost
Class 1b	\$660,000	\$4,960,053
Class 2	\$638,154,900	\$4,795,882,284
Class 3	\$21,068,400	\$158,333,919
Class 5	\$442,799,931	\$3,327,744,321
Class 6	\$150,466,950	\$1,130,794,075
Class 7a	\$21,272,500	\$159,867,778
Class 7b	\$185,508,400	\$1,394,138,710
Class 8	\$5,297,200	\$39,809,688
Class 9a	\$9,339,600	\$70,189,263
Class 9b	\$176,490,000	\$1,326,363,340
Total Cost	\$1,651,057,881	\$12,408,083,432

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Observed in the above table, mandating any of the proposals would result in a significant Present Value cost to industry. Appendix A also contains the RLB summary of costs by building and proposal.

Sensitivity Analysis

This section examines the sensitivity of the quantitative analysis to variations in key assumptions underpinning the aggregate gross impact analysis. The sensitivity analysis has been conducted on three areas noting:

- That the distribution of upper building costs and lower building costs is unknown and a midpoint has been used. The sensitivity analysis will test a $\pm 30\%$ variance in construction cost as a result of this uncertainty.
- A real discount rate of 7% has been used in the quantitative analysis, and sensitivity will be tested from a lower bound of 3% to an upper bound of 11%.
- The rate of approvals has been derived from Victorian data that has been extrapolated across Australia. The extrapolation exercise could contain a degree of error. The sensitivity analysis will test a variance of $\pm 20\%$.

The outcomes of the sensitivity analysis are summarised in the table below, in present value terms, with the impact of each on the assessed level of quantitative costs and benefits provided.

Table 12: Net Present Value Sensitivity Analysis

Parameter	Cost	Net Costs
Approvals		
Lower bound 20% decrease	\$1,320,846,305	\$9,926,466,746
Upper bound 20% increase	\$1,981,269,457	\$14,889,700,118
Alternative Discount Rates		
Lower bound 3% discount rate	\$1,651,057,881	\$14,506,374,379
Upper bound 11% discount rate	\$1,651,057,881	\$10,793,043,847
Construction Costs		
Lower bound 30% decrease	\$1,155,740,516	\$8,685,658,397
Upper bound 30% increase	\$2,146,375,245	\$16,130,508,459

As observed above, variation in the major assumptions still results in a large Present Value cost.

Effectiveness of the Proposals

Bruck and Thomas³⁵ conducted a research report on the waking effectiveness of tactile and visual alarms on a sample of the hearing impaired population. The report concluded that under normal testing conditions the pillow shaker devices awoke 85% of the hard of hearing participants at the intensity level as purchased (vibrating at intermittent pulses).

A report by the Fire Industry Association³⁶ in 2012 on the effectiveness of visual alarm devices concluded that VADs were highly effective, ranging from 80%-90% effective, in notifying occupants while awake. It should be noted that the extent and coverage of the test programme was limited and they suggested further tests would be beneficial including using a cross-section of people, e.g. including persons with hearing impairments.

From a life safety perspective, the benefits associated with the remainder of the proposals are unknown. However these proposals were developed in collaboration with the disability sector, and it is likely that by implementing the above proposals would be of benefit to people with disability in an emergency event.

Benefits

The primary benefits of the proposals relate to:

- improving the dignity and independence of people with disability in evacuating buildings and:
- reducing the current inequities within the built environment.

These benefits, while accepted as valid, are considered intangible as they primarily relate to creating equal opportunity for people with disability and the avoidance of dignitary harm associated with the reliance of others in emergency events.

³⁵ I. Thomas, D. Bruck (2007) "Strobe Lights, Pillow Shakers and Bed Shakers as Smoke Alarm Signals"

³⁶ Fire Industry Association (2012) "Report on tests conducted to demonstrate the effectiveness of visual alarm devices (VAD) installed in different conditions."

Consultation Question:

- Are there additional benefits that can be assigned to the proposals and how can these be described/quantified?

Measuring human dignity in Cost Benefit Analysis (CBA) has been attempted by many government agencies both in Australia and internationally. Both supporters and opponents of CBA have expressed the view that dignity and CBA fundamentally do not mix³⁷.

Dignitary harm can take multiple forms when associated with the urgency of evacuating buildings. This may include the loss of reputation in the eyes of others; psychological feelings of humiliation; exposure of intimate details; and loss of control over one's surroundings.

The fact that dignity has multiple meanings does not imply that the notion is too subjective to be useful in CBA but that dignity takes on a particular meaning relative to a particular social context. In the context of emergency egress, reliance on others is likely to generate emotional distress for people with disability particularly when the situation is life threatening. The extent to which this dignitary harm impacts a person with disability is an unknown, it is however, expected to be quite high.

Attempting to monetise these benefits in CBA is often misguided and leads to incorrect valuation. Due to this, this Consultation RIS does not attempt to monetise these benefits; instead the purpose of this Consultation RIS is to seek feedback from the community to determine the extent to which dignitary harm is a problem in relation to emergency egress.

An effort to monetise dignity is difficult for three main reasons³⁸:

1. Dignity's complex and malleable nature makes the concept difficult to monetise for principled theoretical reasons.

Dignitary benefits are often associated with other types of benefits. Consequently it is hard to disaggregate people's willingness-to-pay for dignity from their willingness-to-pay for other benefits such as life safety.

2. Attempting to monetise dignity is likely to result in the failure to value dignity in the proper way.

Regulatory agencies have previously used unmonetised benefits as a "finger on the scale" in the determination of regulatory outcomes where the monetised cost and benefits are fairly close. However benefits such as dignitary benefits cannot serve the same role between monetised costs and benefits where there is significant difference. In doing so would implicitly value dignitary benefits several times higher than the value of statistical life.

3. Monetised CBA may tend toward various valuations, and it is especially important to resist this trend in the case of dignity.

³⁷ R, Bayefsky (2014) The Yale Law Journal: "Dignity as a Value in Agency Cost-Benefit Analysis".

³⁸ R, Bayefsky (2014) The Yale Law Journal: "Dignity as a Value in Agency Cost-Benefit Analysis".

Due to the nature of dignity and the multiple meanings it represents to the community, people value dignity differently based on the social context to which it is used. It is due to this that it is ill-suited to the assignment of a uniform monetary value.

Although dignitary benefits are not quantified in this RIS it is recognised as a basic human right. Often human rights can be enjoyed equally by all without creating conflicts. Delivery of these rights is often through anti-discrimination laws and is generally accepted by all in the community. In some cases however, conflicts arise between meeting the rights of some people and the associated costs imposed on the broader community.

In the case where there are conflicts, decisions must be made about how far they will be pursued. Society has limited resources and many competing demands. Depending on how social welfare is considered by the community, pursuing some rights beyond a certain point might impose unacceptable costs on the community. Under the DDA, the right to freedom from discrimination is not absolute. In many circumstances, discrimination is not unlawful if preventing it would create 'unjustifiable hardship'.

The question this Consultation RIS seeks to answer is whether the community believes the proposals described above are reasonable adjustments to reduce the inequities currently occurring in the built environment.

Consultation Question:

- Do you consider the proposals described above are reasonable adjustments to reduce the current disability discrimination occurring in new buildings?

Option 2

An advantage of this option is that governments and industry could target buildings that may be more hazardous for people with disability in an emergency event. It is unlikely however, that uptake of a non-regulatory handbook would be significant by industry given the costs of implementing the proposals.

Consultation

Consultation is the cornerstone of the ABCB's commitment to create a contemporary and relevant construction code that delivers good societal outcomes for health, safety, amenity and sustainability in the built environment. This must be achieved in the context of good regulatory practice that evaluates the costs and benefits to society, as per the objective of the ABCB's Inter-Government Agreement. The ABCB recognises the value of engaging constructively with the community and industry in order to achieve this.

The *Directions Report on Egress for All Occupants* was released by the ABCB for the purposes of public consultation in considering the proposals in October 2013.

The report provided background to the issues associated with disability egress, and responses were generally supportive of the proposals to assist occupants with vision and dexterity impairment were important steps to codifying the obligations under the DDA. The Directions Report also discussed use of refuges as a means of affording protection to occupants with mobility impairment. Refuges are protected areas within buildings designed to afford protection for occupants. While construction is technically achievable, they are reliant on trained personnel to effect ultimate evacuation and feedback on the report suggested questions remain over user attitudes and therefore their effectiveness as most respondents expressed a strong preference for lifts, as refuges were considered a less equitable solution.

As highlighted through the Consultation RIS, there are a number of issues that remain uncertain with respect to the proposed NCC amendments. Through the public consultation phase, the ABCB is seeking information on a number of key questions as detailed throughout this report.

Comments are invited by close of business Friday 31 October 2014, and can be emailed to abcbris@iinet.com.au with the subject title "Emergency Egress RIS".

Conclusion

The problem involves a combination of two components: the life safety of occupants with disability and the inability to evacuate buildings independently, and the obligations of building owners and occupiers to ensure as far as practicable, that dignified and equitable access to and within buildings, including its fire safety features is provided for people with disability.

The extent of the problem is indicated by the historical incidence of emergency events and the extent of discrimination to people with disability that is occurring as a result of providing inadequate emergency egress facilities.

From a life safety perspective, the risk to life is very small. Emergency events are rare in Australia and new buildings are considered generally very safe. In the event of an emergency occurring, either individually or collectively, people respond rationally to the nature of that emergency and assist others where possible. Overall there is a risk to particular occupants in particular situations, but this risk is small.

From an equity view point, people with disability are clearly disadvantaged when it comes to the lack of facilities being provided for safe, equitable and independent egress. The extent of this problem

must then be considered in the context of the practicality and availability of reliable options, and their costs. The community is encouraged through disability discrimination legislation to make reasonable adjustments to ensure that discrimination of people with disability is reduced without causing unjustifiable hardship.

The costs of the proposals collectively are annual cost of \$1,651,057,881 with a Present Value cost of \$12,408,083,432. The benefits of the proposals to an extent are uncertain and intangible and cannot be quantified.

Due to this uncertainty, this Consultation RIS seeks feedback on the proposals and specifically asks the community and industry groups whether they consider the proposals to be reasonable adjustments to the building requirements that reduce the current discrimination occurring in new buildings. Comments are welcome on the RIS by the 3rd of October 2014.