Automatic Fire Suppression Systems for Covered Balconies in Residential Buildings

Consultation RIS

March 2016

This Regulation Impact Analysis 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 assess the cost-effectiveness of including new requirements for sprinkler protection of covered balcony areas in all new high rise residential buildings.

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 buildings. The ABCB promotes efficiency in the design, construction and performance of buildings through the National Construction Code (NCC), 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.

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The General Manager
Australian Building Codes Board
PO Box 9839, Canberra City, 2601

Or by email: abcb.office@abcb.gov.au

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Glossary

Abbreviation	Full Name
ABCB	Australian Building Codes Board
BMF	Building Ministers' Forum
COAG	Council of Australian Governments
DtS	Deemed-to-Satisfy
NCC	National Construction Code
OBPR	Office of Best Practice Regulation
RIS	Regulation Impact Statement

The Problem

The problem is the risk to life safety of building occupants from a fire igniting on a balcony of a residential building, where the interior of the building is protected by a fire sprinkler system but where the balcony is not sprinkler protected.

Currently, the deemed to satisfy (DtS) provisions of NCC Volume One require all residential buildings over 25 metres in effective height be fitted with a fire sprinkler system throughout the building complying with Australian Standard AS 2118.1 'Automatic Fire Sprinkler Systems'. The Australian Standard permits fire sprinklers to be omitted from certain areas of sprinkler protected buildings, including some balconies. Balconies that do not exceed 6m² in floor area and which do not have a depth in excess of 2 metres are not required to be sprinkler protected, provided both criteria are met. Hence, the problem arises where the building is over 25 metres, where the interior is sprinkler protected, but where the balcony area is not.

Building Ministers were presented with information about this problem at the July 2015 Building Ministers' Forum (BMF). Ministers requested that the ABCB consider and report on possible amendments to the NCC to require sprinkler protection to all covered balconies irrespective of their size, in Class 2, Class 3, Class 4 and Class 9 buildings.

Two recent fire events were considered by Building Ministers, who are now considering whether the current fire safety requirements in the NCC adequately safeguard occupants from injury or fatality in high-rise buildings. It is considered that the two fire events may have been less severe if the fire sprinkler system had also served the balconies. However, as described below there are other factors that contributed to the severity of these fires which sprinklers alone may not have addressed.

The first fire event occurred on a balcony in a Class 2 residential apartment building in Bankstown on 6 September 2012. The apartment building was not fitted with a fire sprinkler system as the building was less than 25m in effective height as per the requirements of the NCC. The fire scenario and fire behaviour is thought to be the result of high wind and the presence of high fuel load on the balcony. It is understood that the building had a number of NCC non-compliances which may have contributed to the development of the fire and the lack of alarm notification to the building occupants. Tragically, one fatality occurred and another person was severely injured. The Coroners Court, in its report, was critical of the lack of a fire sprinkler system and subsequently recommended that the ABCB consider amending the NCC to require the installation of fit-for-purpose sprinkler systems in all new Class 2 and 3 buildings below 25m. Consideration of this recommendation is being progressed via a separate ABCB project.

Had a fire sprinkler system been installed in the building the Coroner concluded that it was very likely that no fatality or serious injury would have resulted. The Coroner, in its summation of the circumstances that led to the fatality, expressed most concern at the lack of an internal sprinkler system rather than the lack of sprinkler protection of the balcony.

The second fire event occurred in an apartment complex in Docklands, Melbourne on 25 November 2014. The fire commenced on the balcony of an apartment on the 8th floor and rapidly spread vertically affecting 16 apartments. The fire scenario and fire behaviour encountered by the

fire brigade was said to be a scenario not commonly encountered by a fire brigade attending high-rise buildings.

Key observations that contributed to the severity of the scenario included:

- Use of combustible external wall cladding in contravention of the NCC's (DtS) requirements.
- The Emergency Warning and Intercommunication System to warn building occupants of the threat of fire was compromised.
- Fire extinguishers not being accessible to building occupants.
- Apartment smoke alarms had been tampered with.

From the information available it is understood that the building's facade did not comply with the requirements of the NCC which resulted in the rapid vertical spread of fire from the balcony area. The balcony on which the fire initiated was not sprinkler protected due to its size. It is also understood that fire did not spread to within the building as a result of the activation of the internal fire sprinkler system. No fatalities occurred as a result of this fire event.

These two recent building fires indicate that a key factor that contributed to the risk to life safety was reported NCC non-compliances. No evidence is available to suggest that the provisions of the NCC are inadequate in addressing the risk to life safety from a balcony fire in a residential building with a complying fire sprinkler system installed. There is also no information about injuries or fatalities that have occurred as a consequence of balcony fires in buildings with a fire sprinkler system installed.

Balcony areas of residential buildings often contain combustible material including tables, chairs, air conditioning appliances, barbeques and gas bottles. This is particularly the case in Class 2 buildings where balconies are also used as a convenient location for storage that can create a potential fuel load. The presence of combustible material on residential balconies adds to the likelihood of a fire starting on a balcony and the possible severity of the fire.

As shown by the recent Bankstown fire event, a threat to occupants can occur if a door to a balcony or a window adjacent to a balcony is open, as this allows fire to spread to the interior of the apartment. In these circumstances the fire sprinkler system is expected to operate and control the fire spread internally, and so address the risk to life safety.

The Melbourne Dockland's fire event has highlighted the potential consequences associated with NCC non-compliance. It is acknowledged that the issue of non-compliance is a separate matter and although the mandatory installation of fire sprinklers on all balconies would mitigate risks associated with non-compliance, it should not be used as a solution to the problem. However, had the building façade been constructed to comply with the NCC and had the other fire safety features (fire extinguishers, smoke detectors) been made available to occupants, it is considered that the rapid spread of fire may not have occurred and that the fire would have been contained to the balcony of fire origin.

In the report 'Fire Hazards of Exterior Wall Assemblies Containing Combustible Components' commissioned by the Fire Protection Research Foundation (June 2014) the conclusion states "*The percentage of exterior wall fires occurring in buildings with sprinkler systems installed ranges from*

15-39% for the building height groups considered. This indicates that whilst sprinklers may have some positive influence, a significant percentage of external wall fires still occur in sprinkler protected buildings, which may be due to both external fire sources or failure of sprinklers. On this basis it is recommended that controls on flammability of exterior wall assemblies should be the same for sprinkler protected and non-sprinkler protected buildings." This indicates that in the case of the Dockland's building fire the provision of sprinkler protection to the balcony may not have lessened the impact of the fire.

There are a number of other issues that relate to the problem of risk to life safety on non-sprinkler protected balconies. The first of these is the changing nature of habitation. There has been a significant change in where and how we live and a significant proportion of the population is moving from detached housing to apartment living. With this change in lifestyle we have continued to entertain outside and cook on barbeques. Both of these activities present a level of risk to a fire starting on a balcony. Many people downsizing find they often have more possessions than space to store them so the balcony often defaults as a makeshift storage area. This point is supported by the Metropolitan Fire Brigade's post incident analysis report on the Dockland's building fire. Air-conditioning is also a prerequisite of modern living and as such the majority of balconies house the heat pump for the apartment's heating and cooling system. It is understood that the fuel load associated with the air conditioning unit (heat pump) significantly contributed to the fire in the case of the Bankstown fire.

Densities within apartments, particularly within city centres, appear to be increasing. There have been a number of recent media reports which indicate rental supply is tightening to the point where rooms are available for share (twin beds) and make shift rooms are being created to accommodate more people per unit, which reduces the cost of rent for individuals. The apartment (balcony) in which the Bankstown fire originated included a make shift room that was separated from the living area. The potential risk of injury or death due to a fire increases as the number of occupants per unit increases. The NCC does not regulate occupancy numbers within apartments, although there may be pertinent planning regulations and body corporate rules that address this issue.

There is no known Australian academic literature available on the nature of the specific problem identified although there is one recent international study - Fire Chief Len Gari and Dr. Joseph Clare (2013) *Fires that Commence on Balconies of Multi-Residential Buildings,* University of the Fraser Valley, Canada.

In summarising the findings of this study, fires that commenced on balconies of multi-residential buildings were found to be:

- Less likely to activate a smoke alarm and more likely to require visual sighting of some other means of personal detection.
- More likely to require fire brigade intervention.
- Less likely to have burned out on their own, less likely to have been controlled by the removal/shut-off of fuel, and less likely to have been controlled by sprinklers.
- More likely to extend further than the building of fire origin.

The above findings highlight the risk of fire on balconies including the risk of a fire not being detected or extinguished once developed. There is a risk of fires starting on balconies and the

possibility of these fires becoming severe. This information demonstrates a risk of fire which can have life safety implications. It should be noted that this risk is addressed through the current provisions of the NCC that require an internal fire sprinkler system in all residential units above 25 metres, and on the basis of available evidence it would appear that the operation of the internal fire sprinkler systems is adequate to protect life safety.

A number of consultation questions are provided below to assist in further exploring the nature and extent of the problem.

Consultation Questions:

- How would you characterise the nature of the problem?
- Do you have information on the extent of this problem in buildings that comply with the NCC?
    - How many fatalities per year can be attributed to this problem?
    - How many injuries per year can be attributed to this problem?
- Can you explain how a problem might arise in a sprinkler protected building that complies with the NCC?
- Are you aware of any other academic literature on the problem?

Objective

The objective relates to the safety of occupants in new residential buildings over 25 metres in effective height.

The specific objective of this RIS is to assess options that safeguard occupants of new residential buildings over 25 metres in effective height through measures that respond effectively to a fire event.

Options

Building Ministers, at the July 2015 Building Ministers' Forum, requested that the ABCB consider and report on possible amendments to the NCC to require sprinkler protection to all covered balconies, irrespective of their size, in Class 2, Class 3, Class 4 and Class 9 buildings.

Five options are presented for the consideration of Building Ministers.

Option 1 - The Status Quo

The Status Quo is the default choice for decision-makers in considering alternatives to achieve the objectives. 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, this RIA will conclude in favour of the Status Quo.

The Status Quo will be regarded as a baseline, as a basis to determine the incremental impacts of the other options.

Option 2 – Reduce the scope of the current exemption in Class 2 buildings

This option would transfer the list of permitted exemptions in the Australian Standard to the NCC and reduce the size of balcony area permitted to be non-sprinkler protected for Class 2 buildings only.

Currently balconies that do not exceed 6m² in floor area and which do not have a depth in excess of 2 metres are not required to be sprinkler protected. As both criteria must be met before fire sprinklers become a requirement it is thought that some larger balconies which are capable of storing large fuel loads may not be sprinkler protected, i.e. an unprotected balcony is able to be larger than 6m² provided it is not deeper than 2 metres. This option would require all balconies over 10 m² regardless of depth to be sprinkler protected noting that the majority of balconies of this size would already be required to be sprinkler protected.

Option 3 – Remove exemption for Class 2 buildings

This option would transfer the list of permitted exemptions in the Australian Standard to the NCC. The NCC would then remove the permitted exemption for balconies in Class 2 buildings and require sprinkler protection regardless of size.

Option 4 – Reduce the scope of the current exemption in Class 2, 3, 4 and 9 buildings

This option would transfer the list of permitted exemptions in the Australian Standard to the NCC and reduce the size of balcony area permitted to be non-sprinkler protected in Class 2, 3, 4 and 9 buildings. This Option would require all balconies over 10m² regardless of depth to be sprinkler protected in these buildings noting that the majority of balconies of this size would already be required to be sprinkler protected.

Option 5 – Remove the exemption for Class 2, 3, 4 and 9 buildings

This option would transfer the list of permitted exemptions in the Australian Standard to the NCC. The NCC would then remove the permitted exemption for balconies in Class 2, 3, 4 and 9 buildings and require sprinkler protection regardless of size.

Consultation Questions:

- Do you believe there are any other feasible options?
- Options 2 & 4 propose to amend the current exemption to 10m².
  - Should an alternative size floor area be proposed?
  - Do you have any information to support your answer to the above?

Impact Analysis

This section provides an assessment of the incremental costs and benefits of the Options 2-5 compared with the status quo baseline.

Assumptions

The following assumptions have been used in preparation of this cost-benefit analysis:

1. Thirty percent of all residential buildings within scope are required to be sprinkler protected.
2. Twenty percent of all balconies currently require a fire sprinkler system as they do not meet the exemption criteria in AS2118.
3. The distribution of sole-occupancy units between building classifications is unknown. For the purposes of this analysis it has been assumed that the high majority of sole-occupancy units completed in 2014 were apartments (Class 2 buildings), followed by hotels/motels (Class 3 buildings).
4. Advice from Rider Levett Bucknall (RLB) indicates that new Class 9a buildings and Class 4 parts of buildings are not typically constructed with balconies. These sole-occupancy units have been excluded from the analysis as shown.

Consultation Questions:

- Do you have information on the percentage of residential buildings that require sprinkler protection?
- Do you have information on the distribution of sole-occupancy units between building classifications?

Number of Buildings

The Australian Bureau of Statistics reports that in 2014 there were approximately 70,500 residential sole-occupancy units completed in Australia[1].

The estimated distribution of sole - occupancy units in each building class is shown in Table 1.

Table 1 - Estimated distribution of sole-occupancy units across each building class

Building Class	Expected number of sole-occupancy units
Class 2	59,925 (85%)
Class 3	7,050 (10%)
Class 4	350 (0.5%)
Class 9a	1060 (1.5%)
Class 9c	2,115 (3%)
Total	70,500 (100%)

[1] Australian Bureau of Statistics (2015), "*Building Activity*", ABS Cat. No. 8752, ABS, Canberra.

Costs

The costs associated with each option are informed by a report undertaken by RLB[2]. See Attachment A for their full cost analysis report.

Option 2 - Reduce the scope of the current exemption in Class 2 buildings.

This option would require all balconies over 10m² to be sprinkler protected in all new Class 2 buildings. The number of balconies in new Class 2 buildings that are over 10m² and do not already require sprinkler protection is difficult to measure. For the purposes of this analysis it has been assumed that the majority of balcony areas that exceed this threshold would require sprinkler protection. Therefore it has been assumed that 20% of balconies in sprinkler protected Class 2 buildings would be impacted by this option.

The cost of Option 2 is shown in Table 2.

Table 2 - Cost of sprinkler protecting balconies over 10m² in Class 2 buildings

Description	Total
Number of sole-occupancy units constructed annually in Class 2 buildings (85%)	59,925
Number of sole-occupancy units in sprinkler protected buildings (30%)	17,978
Number of sole-occupancy units in sprinkler protected buildings that contain non-sprinkler protected balconies (80%)	14,382
Number of balconies over 10m² non-sprinkler protected (20%)	2,876
Cost per sole-occupancy unit	$2,000
Total installation cost	$5,752,800
Present Value[3] installation cost	$43,233,628

Consultation Question:

- Do you have information on the percentage of balconies not sprinkler protected in an otherwise sprinkler protected Class 2 building?
- What proportion of balconies in new Class 2 buildings would be over 10m²?

Option 3 – Remove exemption for Class 2 buildings.

This option would require all balconies in all new Class 2 buildings over an effective height of 25 metres to be sprinkler protected. The costs of Option 3 are shown in Table 3.

[2] RLB (2015), *"Report on the cost implications of proposals to amend the D-T-S provisions of sprinkler protection to covered balconies"*.

[3] The Present Value has been calculated using a discount rate of 7% over 10 years.

Table 3 - Cost of sprinkler protecting all balconies in Class 2 buildings

Description	Total
Number of sole-occupancy units constructed annually in Class 2 buildings (85%)	59,925
Number of sole-occupancy units in sprinkler protected buildings (30%)	17,978
Number of sole-occupancy units in sprinkler protected buildings that contain non-sprinkler protected balconies (80%)	14,382
Cost per sole-occupancy unit	$2,000
Total installation cost	$28,764,000
Present Value installation cost	$216,168,140

Option 4 – Reduce the scope of the current exemption in Class 2, 3, 4 and 9 buildings.

This option would require all balconies over 10m² to be sprinkler protected in all new Class 2, 3, 4, 9a and 9c buildings over an effective height of 25 metres. The number of balconies in new Class 2, 3, 4, 9a, and 9c buildings that are over 10m² and do not already require sprinkler protection is difficult to measure. For the purposes of this analysis it has been assumed that the majority of balcony areas that exceed this threshold would require sprinkler protection. Therefore it has been assumed that 20% of balconies in sprinkler protected Class 2,3,4, 9a and 9c buildings would remain exempt.

The costs of Option 4 are shown in Table 4.

Table 4- Cost of sprinkler protecting balconies over 10m2 in Class 2, 3, 4, 9a and 9c buildings

Description	Class 2	Class 3	Class 4	Class 9a	Class 9c
Number of sole-occupancy units constructed annually	59,925	7,050	353	1,058	2,115
Number of sole-occupancy units in sprinkler protected buildings (30%)	17,978	2,115	106	317	635
Number of sole-occupancy units in sprinkler protected buildings that contain non-sprinkler protected balconies (80%)	14,382	1,692	0	0	508
Number of balconies over 10m2 not sprinkler protected (20%)	2,876	338	0	0	102
Cost per sole-occupancy unit	$2,000	$3,000	$2,000	$2,000	$2,000
Total installation cost	$5,752,800	$1,015,200	$0	$0	$203,040
Present Value installation cost	$43,233,628	$7,629,464	$0	$0	$1,525,893

The total Present Value cost of this option is estimated to be $52,388,985.

Consultation Question:

- Do you have information on the percentage of balconies not sprinkler protected in an otherwise sprinkler protected Class 3, 4, 9a or 9c building?
- What proportion of balconies in new Class 3, 4, 9a or 9c buildings would be over 10m²?

Option 5 – Remove the exemption for Class 2, 3, 4 and 9 buildings.

This option would require all balconies in all new Class 2, 3, 4, 9a and 9c buildings over an effective height of 25 metres to be sprinkler protected.

The costs of Option 5 are shown in Table 5.

Table 5 - Cost of sprinkler protecting all balconies in Class 2, 3, 4, 9a and 9c buildings

Description	Class 2	Class 3	Class 4	Class 9a	Class 9c
Number of sole-occupancy units constructed annually	59,925	7,050	353	1,058	2,115
Number of sole-occupancy units in sprinkler protected buildings (30%)	17,978	2,115	106	317	635
Number of sole-occupancy units in sprinkler protected buildings that contain non-sprinkler protected balconies (80%)	14,382	1,692	0	0	508
Cost per sole-occupancy unit	$2,000	$3,000	$2,000	$2,000	$2,000
Total installation cost	$28,764,000	$5,076,000	$0	$0	$1,015,200
Present Value installation cost	$216,168,140	$38,147,319	$0	$0	$7,629,464

The total Present Value cost of this option is estimated to be $261,944,923.

Maintenance Costs

Ongoing maintenance and replacement costs were investigated as part of this analysis. Findings on this investigation suggest that the costs associated with maintenance and replacement is difficult to accurately quantify and may vary. Stakeholders are encouraged to provide information that may assist quantification of the incremental costs.

Consultation Question:

- Do you have information on how much it costs to maintain a sprinkler system on a per sprinkler head basis for Class 2, 3, 4, 9a and 9c buildings?

Benefits

There are benefits from extending internal sprinkler protection to the balconies in controlling fires that start on balconies and so reduce occupants' risk to life safety from these fires.

The issue is how much will the risk to life safety be reduced? The internal fire sprinkler systems are already adequate in protecting occupants' life safety inside the residential unit. It is possible to improve upon an "adequate" level of protection, however that improvement may be imperceptible.

The value of an additional level of protection in extending sprinklers to all residential balconies is ultimately a subjective assessment. There would be an incremental improvement in protecting life safety however that improvement will be difficult to measure in terms of additional injuries and fatalities avoided.

As noted in the description of the problem, the fuel load on balconies is a critical factor in the severity of a fire. Where balconies are used as storage areas, as often happens in Class 2 buildings, the fuel load will be higher and a fire will be more severe. Hence the first two options focus on Class 2 buildings.

Option 2 would require sprinkler protection on the larger balconies where the fuel load would be greatest and the risk of a severe fire more acute. Option 2 therefore targets balconies of higher risk. Option 3 seeks to eliminate the risk altogether by requiring all balconies in Class 2 buildings to be sprinkler protected. Both options would provide some additional protection and would target the large majority of occupants in residential buildings that contain balconies.

Options 4 and 5 include other residential buildings where fuel load on the balconies is much less of an issue in practice. The additional protection of the other residential buildings may not be much benefit to occupants in practice.

Break Even Analysis

There is no available evidence to indicate the extent of the problem in terms of recorded fatalities. In these circumstances a break-even analysis can be helpful to indicate the reasonableness or otherwise of the possible benefits of the options. A break-even analysis calculates the benefits needed to equal the costs using a key assumption. In this case the key assumption is the number of fatalities per year that might be avoided under each option – the assumed reduction in the risk of death from a fire event occurring on a balcony which isn't sprinkler protected in a high rise building. Benefits are calculated by multiplying the key assumption by the Value of a Statistical Life[4].

[4] The value of statistical life is an estimate of the financial value society places on reducing the average number of deaths by one and is calculated as $4.2 million per life saved which aligns with the Office of Best Practice Regulation Guidance Note.

The number of fatalities required to be avoided per year for the calculated benefits to equal the costs are shown in Table 6 for each option.

Table 6 - Break-Even Analysis of Options

	Present Value Costs	Annual number of fatalities per year required to be avoided
Option 2	$43,233,628	0.8
Option 3	$216,168,000	3.7
Option 4	$52,388,985	0.9
Option 5	$261,944,923	4.4

Notes:

1. Present value costs calculated using a 7% discount rate over a ten year period.
2. Present value benefits calculated using a 7% discount rate over a forty year period.

The break-even analysis shows that between 0.8 and 4.4 fatalities need to be avoided per year for the benefits to equal the costs. This fatality rate is very high based on the available information indicating no recorded fatalities has occurred as a direct result of the described problem.

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:

- 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%.
- Construction costs may vary between States and Territories. The sensitivity analysis will test a variance of ±20%.
- The approval rate of sole-occupancy units that currently contain non-sprinkler protected balconies is not known, however thought to be the large majority. The sensitivity analysis will test a variance of ±10%.

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 provided.

Table 7 - Sensitivity Analysis

Sensitivity	Option 2	Option 3	Option 4	Option 5
Lower bound discount rate (3%)	$50,544,727	$252,723,637	$61,248,317	$306,241,584
Upper bound discount rate (11%)	$37,606,327	$188,031,635	$45,570,020	$227,850,099
Lower bound construction costs (-20%)	$34,586,902	$172,934,512	$41,911,188	$209,555,938
Upper bound construction costs (20%)	$51,880,354	$259,401,768	$62,866,782	$314,333,908
Lower bound number of non-sprinkler protected balconies (70%)	$37,829,425	$189,147,123	$45,840,362	$229,201,808
Upper bound number of non-sprinkler protected balconies (90%)	$48,637,832	$243,189,158	$58,937,608	$294,688,038

Victorian Scenario

The Department of Environment, Land, Water and Planning in Victoria has recently undertaken an analysis which assesses the incremental costs of installing an additional sprinkler head on small covered balconies in all new Class 2, 3, 4, 9a and 9c buildings that are already required to be sprinkler protected in Victoria. Victoria estimates that the cost of installing a single additional sprinkler head per small covered balcony to be $450 which is substantially less than the costings undertaken by RLB.

The input costs for this analysis were derived from Rawlinsons Australian Construction Handbook 2015, which is based upon estimates for projects exceeding $1.5 million. This cost estimate is based on the supply and installation of a single additional sprinkler head, including 3 metres of standard pipe. In addition to this figure, a further 1.04 hours of labour was allowed for plumber attendance at both the slab-pour and fit-out stages.

As this cost estimate differs from the central scenario, a scenario analysis was conducted to determine the national impact of each option assuming the Victorian costs. The results of this scenario analysis are shown in Table 7.

Table 8 – Victorian Present Value Cost Implication Scenario

Option	Class 2	Class 3	Class 4	Class 9a	Class 9c	Total PV Cost
Option 2	$9,727,566	$0	$0	$0	$0	$9,727,566
Option 3	$48,637,832	$0	$0	$0	$0	$48,637,832
Option 4	$9,727,566	$1,144,420	$0	$0	$343,326	$11,215,31
Option 5	$48,637,832	$5,722,098	$0	$0	$1,716,629	$56,076,559

Each option presents a net cost under all scenarios tested.

Consultation Question:

- Do you have information on the incremental cost of installing an additional sprinkler head on a small covered balcony in a building that is already required to be sprinkler protected?

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.

As highlighted through the Consultation RIS, there are a number of issues that remain uncertain with respect to the nature and extent of the problem. 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 26 April 2016, and can be emailed to abcbris@abcb.gov.au with the subject title "Fire Sprinkler RIS".

Conclusion

The problem is the risk to life safety of occupants from a fire igniting on a balcony of a residential building, where the interior of the building is protected by a fire sprinkler system but where the balcony is not sprinkler protected.

Balcony areas of residential buildings often contain combustible material including tables, chairs, air conditioning appliances, barbeques and gas bottles. This is particularly the case in Class 2 buildings were balconies are also used as a convenient location for storage that can create a potential fuel load. The presence of combustible material on residential balconies adds to the likelihood of a fire starting on a balcony and the possible severity of the fire. The risk of fires on balconies does have life safety implications.

This risk is addressed through the current provisions of the NCC that require an internal fire sprinkler system in all residential units above 25 metres, and on the basis of available evidence it would appear that the operation of the internal fire sprinkler systems is adequate to protect life safety.

The objective of this RIS relates to the safety of occupants in new residential buildings with internal fire safety systems.

Building Ministers, at the July 2015 Building Ministers' Forum, requested that the ABCB consider and report on possible amendments to the NCC to require sprinkler protection to all covered balconies irrespective of their size, in Class 2, Class 3, Class 4 and Class 9 buildings.

Five options are presented for the consideration of Building Ministers.

1. The Status Quo
2. Reduce the scope of the current exemption in Class 2 buildings
3. Remove the exemption for Class 2 buildings
4. Reduce the scope of the current exemption in Class 2, 3, 4 and 9 buildings
5. Remove the exemption for Class 2, 3, 4 and 9 buildings

There are benefits from extending internal sprinkler protection to the balconies in controlling fires that start on balconies and so reduce occupants' risk to life safety from these fires. The issue is how much will the risk to life safety be reduced? The internal fire sprinkler systems are already adequate in protecting occupants' life safety inside the residential unit. It is possible to improve upon an "adequate" level of protection, however that improvement may be imperceptible. The value of an additional level of protection in extending sprinklers to all residential balconies is ultimately a subjective assessment.

Options 2, 3, 4 and 5 all involve very high costs. For example the costs of extending sprinkler protection to the balconies of Class 2 (apartment) buildings range from $43 million to $216 million (present value over 10 years).

In lieu of complete quantitative data on the expected benefits of the options, a break-even analysis concluded that between 0.8 and 4.4 lives would be required to be avoided per year for the calculated benefits to equal the estimated costs. This fatality rate is very high based on the available information indicating no recorded fatalities has occurred as a direct result of the described problem.

In comparing benefits that are subjective and difficult to measure with very large costs, the conclusion of this RIS is that Options 2, 3, 4 and 5 would result in large net costs to society. Option 1, the Status Quo, is supported.