



COMMONWEALTH OF AUSTRALIA

# Proof Committee Hansard

## SENATE

LEGAL AND CONSTITUTIONAL AFFAIRS REFERENCES  
COMMITTEE

**Use of smoke alarms to prevent smoke and fire related deaths**

(Public)

FRIDAY, 4 DECEMBER 2015

CANBERRA

**CONDITIONS OF DISTRIBUTION**

This is an uncorrected proof of evidence taken before the committee.  
It is made available under the condition that it is recognised as such.

BY AUTHORITY OF THE SENATE

**[PROOF COPY]**

## **INTERNET**

Hansard transcripts of public hearings are made available on the internet when authorised by the committee.

To search the parliamentary database, go to:

**<http://parlinfo.aph.gov.au>**

**SENATE**

**LEGAL AND CONSTITUTIONAL AFFAIRS REFERENCES COMMITTEE**

**Friday, 4 December 2015**

**Members in attendance:** Senators Lazarus, Ludwig.

**Terms of Reference for the Inquiry:**

To inquire into and report on:

The use of smoke alarms to prevent smoke and fire related deaths, with particular reference to:

- a. the incidence of smoke and fire related injuries and deaths and associated damage to property;
- b. the immediate and long term effects of such injuries and deaths;
- c. how the use, type and installation set-ups of smoke alarms could affect such injuries and deaths;
- d. what smoke alarms are in use in owner-occupied and rented dwellings and the installation set-ups;
- e. how the provisions of the Australian Building Code relating to smoke alarm type, installation and use can be improved;
- f. whether there are any other legislative or regulatory measures which would minimise such injuries and deaths; and
- g. any related matter.

## WITNESSES

<b>ASHE, Dr Brian Samuel William, Director, Australian Building Codes Board .....</b>	<b>40</b>
<b>BURGESS, Mr Mark, Executive Manager, Commonwealth Scientific and Industrial Research Organisation Services, Commonwealth Scientific and Industrial Research Organisation .....</b>	<b>35</b>
<b>COATE, Ms Carmel, Executive Director, National Fire Industry Association .....</b>	<b>20</b>
<b>DALRYMPLE, Mr Adam, Assistant Chief Fire Officer, Director of Fire Safety, Metropolitan Fire and Emergency Services Board .....</b>	<b>1</b>
<b>HARDING, Mr Mike, National Manager, Building Codes and Standards, Housing Industry Association.....</b>	<b>32</b>
<b>ISAAC, Mr David Paul, Managing Director, Fire and Safety Technologies Pty Ltd .....</b>	<b>24</b>
<b>LOVERIDGE, Mr Raymond William, Director, Australian Building Codes Board .....</b>	<b>40</b>
<b>McDONALD, Mr Matthew, Group Manager, Australian Building Codes Board .....</b>	<b>40</b>
<b>MULLINS, Commissioner Greg, President, Australasian Fire and Emergency Service Authorities Council.....</b>	<b>1</b>
<b>ORR, Mr Christopher Charles, Technical Director, Fire Protection Association Australia .....</b>	<b>12</b>
<b>SAVERY, Mr Neil, General Manager, Australian Building Codes Board .....</b>	<b>40</b>
<b>WELLER, Mr Greg, National Director, Communications, Housing Industry Association.....</b>	<b>32</b>
<b>WRIGHT, Mr Matthew, Chief Technical Officer, Deputy Chief Executive Officer, Fire Protection Association Australia.....</b>	<b>12</b>
<b>YAXLEY, Mr Julian, Manager, Economics and Strategic Projects, Metropolitan Fire and Emergency Services Board.....</b>	<b>1</b>
<b>ZIPPER, Dr Marcus, Director, Commonwealth Scientific and Industrial Research Organisation Services, Commonwealth Scientific and Industrial Research Organisation .....</b>	<b>35</b>

**DALRYMPLE, Mr Adam, Assistant Chief Fire Officer, Director of Fire Safety, Metropolitan Fire and Emergency Services Board**

**MULLINS, Commissioner Greg, President, Australasian Fire and Emergency Service Authorities Council**

**YAXLEY, Mr Julian, Manager, Economics and Strategic Projects, Metropolitan Fire and Emergency Services Board**

**Committee met at 9:00**

**CHAIR (Senator Lazarus):** I declare open this public hearing of the Senate Legal and Constitutional Affairs References Committee for its inquiry into the use of smoke alarms to prevent smoke and fire related deaths. The inquiry's terms of reference are available from the secretariat. The committee's proceedings today will follow the program as circulated. These are public proceedings, being broadcast live via the web.

The committee may also agree to a request to have evidence heard in private session—described as being in camera—or may determine that certain evidence should be heard in camera. I remind all witnesses that, in giving evidence to the committee, they are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee, and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to the committee. The committee prefers evidence to be given in public but, under the Senate's resolutions, witnesses have the right to request to be heard in camera.

It is important that witnesses give the committee notice if they intend to ask to give evidence in camera. If you are a witness today and intend to request to give evidence in camera, please bring this to the attention of the secretariat as soon as possible. If a witness objects to answering a question, the witness should state the ground upon which the objection is taken, and the committee will determine whether it will insist on an answer, having regard to the ground which is claimed. If the committee determines to insist on an answer, a witness may request that the answer be given in camera. Such a request may of course also be made at any other time.

Welcome. Thanks for coming along and talking with us today. The committee has received a submission from the Metropolitan Fire and Emergency Services Board published as submission No. 4 and a submission from the Australasian Fire and Emergency Service Authorities Council published as submission No. 5.

The Senate has resolved that an officer of the Commonwealth or of a state shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to superior officers or to a minister. This resolution prohibits only questions asking for opinions on matters of policy and does not preclude questions asking for explanations of policies or factual questions about when and how policies were adopted.

Before I ask you to make an opening statement, do you wish to make any amendments or alterations to your submission? I invite you to make a brief opening statement before we go to questions.

**Mr Dalrymple:** Thank you for the opportunity today. The Metropolitan Fire Brigade is an emergency services organisation that provides prevention and suppression services to approximately four million people within the metropolitan district of Melbourne. We are an organisation that publicly advocates for the safety of the community to minimise risks to life and property. We closely work with the community to enable it to respond to and recover from emergencies. We have a long history of advocacy, leading debate on issues such as smoke alarms, sprinklers in nursing homes and other care facilities, fire safety in tunnels, and hoarding, just to name a few. It is our view that the best fire safety initiative that has occurred in the last two decades has been the introduction of mandatory smoke alarm legislation.

Smoke and fire related injuries have a devastating effect on all communities and, as a result, many people die and are injured due to fire related burns and smoke inhalation arising from residential fires. Based on hospital and admission data in Melbourne alone, in a 10-year period from 2004 to 2015 there have been 103 fire related fatalities; and 53 of these have been deemed to arise from preventable or accidental residential fires and 26 have occurred in homes where there has been no smoke alarm or the smoke alarm has been disarmed. This data also confirms that the rate of fire related injury in domestic settings is higher than the rate of general injury in domestic settings, around 65 per cent.

While these figures are concerning, we believe these to be underestimated, as not all people present to hospital for treatment after a fire related injury. Some present to a GP, they are treated on the scene by a paramedic or they self-treat or seek no treatment at all. Additional research indicates that the highest risk groups of all people that die as a result of fire in residential settings are people over 65, children between infancy and four years old, and

persons experiencing social or financial disadvantage. We say that, in this day and age, there is really no need for any Australian to die or be harmed as a result of fire in their home.

A recent study commissioned by the MFB in 2011, which was an analysis of preventable fire fatalities of older people and people with disabilities, details a range of issues relative to smoke alarms and discusses the effectiveness of different types of smoke alarms that are available and the methods to power them, and some with special features. The studies conclude—and we support this—that working smoke alarms are a crucial lifesaving mechanism, as a working smoke alarm provides early warning and allows people time to escape prior to any harm.

All fire services in Australia support the AFAC position that the choice of smoke alarm should be photoelectric in residential applications, and the reason for that is that they detect smouldering fires earlier; they detect fires in remote areas, from the smoke alarm itself; and they are more likely to alert occupants and give them time to escape before a fire develops. We believe there is an opportunity to review the Building Code of Australia in an effort to establish a regulated position on smoke alarms that considers smoke alarm type, the risk environment, the number of smoke alarms per sole occupancy unit, the occupant type and the maintenance of the smoke alarms. The current requirements have been in place since about 1997, with only one amendment in 2014, and that was to have smoke alarms interlinked. In reality, this is a little bit outdated and there is a real opportunity to make smarter and better use of smoke alarms to save lives.

Having discussed the issues around smoke alarm type and the requirements for installation, it is also evident from other research that the most vulnerable people in the community and the ones at risk of injury and death from smoke and fire are those that are less likely to be able to install and maintain a working smoke alarm. People over 65 represent 50 per cent of preventable fire fatalities nationally. Social and financial disadvantage limits capacity to access information and establish even a minimal level of home fire safety. People with disabilities are 4.2 times more likely to die and become a fire related fatality than the general population. International students, itinerant workers and new residents are other significant risk groups due to the cooking practices they employ, overcrowding in residential tenancies and not understanding their rights as a tenant.

As set out in our submission, there are a number of recommendations to provide for the reduction of risk to vulnerable groups, whether they be in receipt of community care services or not. We would like the inquiry to review, among other things, feasibility of new and emerging technologies to link smoke alarms to personal alarms; smoke alarms appropriate to the client's risk level; funding arrangements for smoke alarms for the deaf; and, nationally, having a consistent approach in the type, use and applications of smoke alarms in the domestic environment. We see this as a real opportunity for the Commonwealth to show leadership in standards for aged care, and by leading reform in the BCA.

**Commissioner Mullins:** Thank you for the opportunity to speak to you today. I am going to try to give a personal view on what this means to firefighters and people in the community. I know you have been trying to wade through a lot of technical data. I have been a firefighter for 43 years, as a volunteer and then as a full-time firefighter. I am immensely proud of the men and women who serve on the front line saving lives and property. But I worry about them constantly because the incidence of post-traumatic stress disorder is increasing as a result of some of the terrible things they have to witness and deal with.

What this inquiry is dealing with is dear to my heart. If I may I will just relate two short stories that might explain why. Even though I want to, I cannot and will never forget the first two fire fatalities I attended as a 19-year-old rookie firefighter. The first was an elderly woman in a sixth-floor unit at Neutral Bay, near Sydney Harbour. I remember the street name: Merlin Street. It is embedded in my memory. When we arrived, at about 4 am, flames were shooting from windows on two sides of the building and residents above the unit were trapped. We extinguished the flames—although that is a short statement, but it was really difficult to do. When we made entry to a bedroom that was totally burnt out we found a charred body sitting on the edge of the bed. I can see it now and I will never forget the walking frame just out of reach in front of where the person was.

The old lady would have been about the same age as my own grandmother. We found some photos of her with her obviously beloved grandchildren. People had heard screaming earlier in the night but said they did not want to interfere. Maybe if they had heard a smoke alarm go off they would have. I was horrified by what that lady went through and I lost a lot of sleep. In my nightmares I saw my own beautiful grandmother burning.

The next was what we thought was a routine call to a rubbish fire in a street in North Sydney one night. We arrived and found a mattress smouldering on the footpath. I wondered where it had come from and when I looked over at an adjacent block of units I saw a smashed window and smoke coming out of it. My station officer and I, without any breathing apparatus, ran into the block of units and kicked the door of the unit in. We hit the floor, because of the smoke—there is always a bit of air near the floor—and went in different directions, crawling on

the floor to search. It was pitch black. You could not see anything so you had to feel your way through. Something brushed against my face and I reached up and found it was a foot. I crawled to the victim's head, yelled to my officer, then felt for a pulse, but there was nothing.

What struck me later was that he did not have any serious exterior injuries. He looked quite healthy—a ruddy red face. My officer explained to me that that was the carbon monoxide in his system, what we call the silent killer. I have seen many more since and for years I have wondered what we could do as firefighters to stop or at least reduce the number of fire deaths, because no matter how quickly we arrived after getting a call, often it was just too late to save the victims.

The answer came along, and it was smoke alarms. They have saved many people over the years, but I do not think enough. People are still dying for a variety of reasons: because of the type of smoke alarm, because of the number, because of flat batteries and because they disable them after nuisance alarms. As Adam said, some people's personal circumstances mean that they are not capable or they have what they see as far more pressing personal issues for them to worry about having or maintaining a smoke alarm.

As a fire officer who has seen far too many dead people and too much tragedy visited upon devastated families, and too many traumatised fire, police and ambulance officers, I congratulate you on holding this inquiry. I hope and pray it will make a significant difference by adopting recommendations from experts who know what needs to be done. But we just need the legislative and regulatory backing to realise the solutions that are readily available out there. I have a lot of information I can provide. However, it is presented in the AFAC and the Fire and Rescue New South Wales submissions, which I commend to you. I also support the MFB recommendations.

The main messages are that only photoelectric smoke alarms should be allowed. More are needed than the minimum mandated in current regulations. They need to be connected to mains power and interconnected so that they give maximum warning to occupants. Also, all government and non-government organisations that interact with the disadvantaged, the elderly and the disabled need to work together to deal with that disadvantage so that people in those situations have smoke alarms that are working, and that people are trained to recognise where it is not happening.

The other thing that we really want to push is that people are still dying where there are smoke alarms and where they operate. There is a number of reasons for that. The big issue for us with modern furnishings in homes is the phenomenon of flashover. In the 1970s it took 10 to 20 minutes in a normal home. Now it takes two to three minutes. Once flashover occurs, nobody escapes. So we are also advocating home residential sprinklers, which are much cheaper than commercial sprinklers. We have been working with industry on that. There are regulations and standards for it. That would have the effect not only of giving people a warning from the smoke alarm but also suppressing the fire, reducing the heat and reducing the toxic products of combustion, allowing people to escape.

**CHAIR:** Mr Yaxley, do you have anything to add?

**Mr Yaxley:** No. I am here to answer questions.

**CHAIR:** Thank you for coming along today to speak to us. I also want to thank you for the wonderful contribution you give communities around this country. We are indebted to you and I want to congratulate you on the work that you are doing. For the sake of people who may not understand the difference between photoelectric and ionisation smoke alarms, you advocate for photoelectric smoke alarms only. Can you give us a brief explanation why?

**Commissioner Mullins:** In a nutshell, in layman's terms, ionisation smoke alarms detect small particles and they are said to detect flaming fires faster. They have a radioactive source. They ionise the air in a chamber, which allows a current to flow. When small particles enter that chamber they absorb alpha particles, reducing the conductivity, which results in an alarm. Am I getting close, Adam?

**Mr Dalrymple:** Yes.

**Commissioner Mullins:** That is in layman's terms. A photoelectric alarm works quite differently. It has a light source and a light collector. When particles of smoke enter there it obscures or scatters the light. There are two different types and I will not go into the details of those. Those alarms are better at detecting larger particles. People have said that one is good for flaming fires and one is good for smouldering. In my experience as a firefighter just about every fire I have ever been to started as a smouldering fire and went through a stage until it became a flaming fire. To say that they are equal and good for different circumstances is to me a fallacy, an absolute myth.

The other thing people need to be aware of is that a smouldering fire is more lethal than a flaming fire. There is a qualification there. A flaming fire will spread quickly and conditions will become untenable very quickly. But

most fires in residential settings will go through a smouldering phase before they become a flaming fire. If you can detect that quickly, people have the ability to escape.

I referred to toxicity. A flaming fire produces water vapour, a lot of carbon and soot and carbon monoxide and carbon dioxide. Carbon monoxide is toxic. I will explain that in a moment. Carbon dioxide can exclude oxygen and asphyxiate. It is about 10 parts CO<sub>2</sub> to one part carbon monoxide in a flaming fire, because there is plenty of oxygen, so it combines to form CO<sub>2</sub> instead of CO, so it is less toxic. But the heat and the fire travel, making it untenable very quickly.

The smouldering fire produces about the same amounts of carbon monoxide and carbon dioxide. If a person is asleep and they breathe in carbon monoxide their sense of smell is dulled and they will not wake up to the smell of smoke. That is the first thing. Carbon monoxide has more of an affinity to red blood cells, which transport oxygen around the body, than oxygen so it will push out the oxygen and bond with the red blood cells. People will go into a deeper sleep until they actually become unconscious and they will not wake up. They cannot wake up. They are actually unconscious.

The amount of carbon monoxide in the bloodstream can lead to the muscles that are looking for oxygen to operate the cells in the muscles. The heart muscle will just give up, because there is not enough oxygen. It is very insidious, because I have pulled people out of homes and thought they were okay. I have put oxygen on them and they have passed away, because you cannot get that carbon monoxide out of their system quickly. It is very, very difficult. You cannot just give the oxygen. There are not enough red blood cells available to take it on.

That is in a nutshell, and the last thing is, even with a flaming fire, a phenomenon scientists call 'smoke ageing' and 'smoke travels'. With smoke travels, the small particles tend to congregate and become larger particles. Research we have just recently conducted in New South Wales found that photoelectric alarms operated far more quickly than ionisation alarms for smouldering fires—sometimes tens of minutes, sometimes half an hour, sooner. In a flaming fire, ionisation alarms sometimes operated more quickly than a photoelectric alarm but the difference was seconds. We very clearly advocate only photoelectric alarms. My personal view is: ionisation alarms should be banned.

**CHAIR:** Obviously, a lot depends on where the smoke alarms are and that sort of thing. Could you give us a bit of an idea on the time difference—when a potential victim would be notified by a photoelectric alarm compared to an ionisation alarm?

**Commissioner Mullins:** The worst-case scenario—and tests have been done by the National Institute of Standards and Technology in the US by Fire and Rescue NSW—is a 30-minute difference with a smouldering fire and, by then, it is far too late. I have explained carbon monoxide, so if you are breathing in carbon monoxide for 30 minutes, you are not going to survive. And I have been to fires where the fire has actually self-extinguished and there was no smoke left. The fire was the day before, yet we had a deceased person and it never progressed to the flaming stage. So it is crucial to have that early warning.

As far as placement of smoke alarms go, earlier this year in Campbelltown in Sydney we had a situation where a shiftworker was asleep in the morning and had the bedroom door closed. A fire started in a wardrobe. There was no smoke alarm in the bedroom. The fire got bigger. He slept through, and the smoke alarm in the hallway did not operate, because the smoke never reached it. He perished in that fire. We found that he had woken up, but it was too late.

**CHAIR:** You stated that the most at risk of dying in a residential fire are the very old or the very young, and people experiencing social and financial disadvantage. How can these people be better protected? Have you got some ideas on that?

**Mr Dalrymple:** People who receive community care—our information has detailed that the actual carers through no fault of their own do not have any real understanding of smoke alarm legislation and the way smoke alarms work. They will provide care to their clients, which is a really good outcome, but they are not looking around for any other high-risk issues within the dwelling. If smoke alarms are installed, they are not being tested. It is not incumbent on the community care worker to do that, but our recommendations are that, if some training were provided to them on the way smoke alarms work, how to test them and ensure that they are working in good positions, it will assist vulnerable people. After a number of reports that we have written, community services have put some bulletins out for people to look at this sort of stuff; however, it is not embedded in any legislation. We have written a number of submissions prior to this inquiry, in relation to the Residential Tenancies Act and better apartments and living arrangements—for a couple of inquiries in Melbourne—and we were providing the same sort of detail in those sorts of things, to try and bolster this at a national level. We believe that, if that sort of thing can happen and people have access to services, it will go a long way in helping this.

**CHAIR:** My understanding is that places like warehouses and things like that have to put in photoelectric smoke alarms. I am pretty sure it is in the Building Code.

**Mr Dalrymple:** Yes.

**CHAIR:** Does that apply to old-age facilities and things like that?

**Mr Dalrymple:** With residential care facilities, there are different levels of fire protection for different classes of building. Residential care facilities do have to have smoke alarms in them. We call them class 9 buildings. A class 9 building falls into a different category to what we are talking about here in terms of domestic and in a residential setting. The legislation is quite different, and there is a requirement to have, in residential care, the sprinkler protection now in most states. Smoke alarms are mandatory, and in most residential applications you will have two different types. You will have what we call an AS 1670 system to go to the common areas, which is hooked up to a fire indicator panel, and then you will have individual smoke alarms that are stand-alone in every sole occupancy unit. So there are requirements in the Building Code that look after smoke alarms in those classes of building. But, when you take it to the domestic setting, the BCA says you need a smoke alarm and where to place it, but the reference to location, type and maintenance is not very strong. So every state in Australia has had to implement its own regulations to put some strength behind where smoke alarms do and do not go. For example, in Victoria it was 1997, in New South Wales it was 2006 and, more recently, in Western Australia it was only a couple of years ago.

**CHAIR:** Would you be a supporter of national regulatory legislation?

**Mr Dalrymple:** We would. Our submission goes to that, to say that it is great that the states are going on the front foot to minimise fire related fatalities with the implementation of smoke alarm legislation on their own, but it is not consistent and it differs in every state. The example I will give I think was Western Australia. It is only mandatory to put smoke alarms in a building when you are selling it or you are tenanting it. That does not make much sense if it is your own home. In Victoria, for instance, all new homes have to have smoke alarms.

**CHAIR:** But they do not necessarily say what type.

**Mr Dalrymple:** The BCA is prescriptive and it says you can have photoelectric or ionisation and—I mentioned this at another hearing—they are both compliant. But our research and the research that Commissioner Mullins has spoken about quite definitively say that a photoelectric smoke alarm is better.

**Commissioner Mullins:** We are talking about Australian Standard 3786. Some years ago I wrote to Standards Australia and asked the question, because I was previously unaware: why are there two different criteria for ionisation and photoelectric alarms in the tests? I am still waiting for an answer. An ionisation alarm can take tens of minutes to activate and pass the test of 3786, while a photoelectric alarm cannot. So, to me, saying that either alarm is effective is just not correct, and the standard itself is flawed. I know that the Australian Building Codes Board are in a bind, because they have an Australian standard that says that either of these are compliant, but they are not the same. They can comply with totally different performance, and one performance will not save people.

**CHAIR:** Maybe the standards need to be changed in that regard, if ionisation smoke alarms are taking so much longer to activate, although they still fall under the standard. Maybe we should be looking at changing that.

**Commissioner Mullins:** I agree with that.

**Mr Yaxley:** There is another aspect to the inconsistency issue you were raising before, and that is that you have people trading between states and, particularly on the border areas, builders are working in the same areas and they are applying different rules across different things. There is huge cost to that, the lack of awareness.

**CHAIR:** What do you think, in general, is the population's attitude towards smoke alarms?

**Mr Dalrymple:** I will talk from a Victorian perspective because that is where I am from. If you look at the general population, it is generally accepted that smoke alarms are a requirement. People understand that. But, like anything else, people will use the legislation to their own advantage. Where they do not have to provide smoke alarms or do not have to upgrade, they will not.

We talk about interlinking of smoke alarms, which was brought in as a requirement in 2014 in the Building Code. That is for brand-new buildings. From a Victorian perspective, after 1997 there would have been that requirement. But if a building is from before 1997 and you are not doing any work to it, there is no requirement at all to have hard-wired or interlinked smoke alarms in that particular premises. Your mother's house, for instance, might be old. In Victoria you can just have a battery operated smoke alarm put into a position that you think is in accordance with the standard, and that is compliant. From our perspective in Victoria we think, in general, people understand the requirement to have a smoke alarm. But our experience in other states is that, where there is no real concrete requirement to have one, people will not put one in.

**Commissioner Mullins:** In research in New South Wales of five fatalities we found that 46 per cent of premises where fatalities occurred had no working smoke alarm. Six per cent were undetermined because the premises were too badly burned. That points to a level of complacency. Particularly with battery operated smoke alarms, people expect to see one in a building but they do not really think about them. So each year we have campaign about changing your smoke alarm battery, except in Queensland. A lot of people take up that message, but we know that a lot do not.

We also started home fire safety visits in New South Wales, targeting lower socioeconomic profiles—that is, people suffering disadvantage. We found that only 38 per cent of the homes we went into had working smoke alarms. So we gave them free smoke alarms, fire blankets, fire extinguishers et cetera. They were very grateful. They had no idea. They had enough problems in their lives and a smoke alarm was just another thing they could not afford or could not worry about. I think the attitude is, yes, they are great thing and people expect them to be in buildings, but in fact the figures in the report on government services is not reflective of the broader community when it comes to smoke alarm penetration.

**CHAIR:** What are some of the rookie or lackadaisical mistakes we make in regards to smoke alarms?

**Mr Yaxley:** Certainly when turning up to accommodation buildings where you have large numbers of international students—and I think we have all done this—you will see all the doors open and every single occupancy, which is a single student to a room, will have the battery pulled out of the smoke alarm and disconnected because they want to cook in their room, for example. That is a real concern. Because some of these smoke alarms are not hard-wired in, there is no encapsulation of the battery such as we are recommending with the 10-year long-life, tamper-proof photoelectric alarms. Because they are not in place and those students have had no education about the reason for those batteries and their need to be there, they have removed them. This is a real concern. You see time and again that people have removed the battery because they have found the smoke alarm being triggered a nuisance. They have no understanding of the consequences of their actions.

**CHAIR:** What about where they put them? A lot of these cheap ionisation smoke alarms you can pretty much stick on a roof. What about where they place them?

**Mr Dalrymple:** There are preferred places where you would install a smoke alarm. AFAC have publications on that sort of stuff. But normally you would put it on the ceiling more than 30 centimetres away from the corners so it is not in what we call a dead air space. Like Greg, we have been to numerous fires where we have found a smoke alarm present but it has been halfway up the wall and the smoke has not gone down that far so it has not worked. People are maybe trying to do the right thing and look after themselves, but there has been evidence at a lot of fires where there may or may not have been fatalities of incorrect placement of smoke alarms.

Accessibility for people to get that information is one of the things that we talk about. We can provide publications and we do—they are available on our websites. We have dedicated units within our own fires services—community resilience units—that actually make this part of their business. It goes back to what Greg said before—the penetration is not 100 per cent and we are still finding that people do not understand what the legislation is. The itinerant workers and the international students are probably at this present point in time the highest risk groups that we are coming across because you have the overcrowding issue, the overloading of power points and all those types of things in every bedroom—and some of them are not bedrooms; they are just a bit of plasterboard stuck up and a padlock on a door for someone to have privacy—and no smoke alarm or the actual location of the smoke alarm compromised because of that.

**CHAIR:** We are seeing now an appetite for unit blocks. Are you finding there is an increase in fires in unit blocks and, if so, why would that be the case?

**Commissioner Mullins:** Yes. There are a lot of issues we are finding in unit blocks—overcrowding and unauthorised modifications. You may be aware that we recently had a coronial in New South Wales into a unit fire in Bankstown where two unfortunate young ladies jumped. One died and one was seriously injured. That unit had been modified to add an extra bedroom. We have found units where they have put in extra floors—people are sleeping on top of each other. If a fire started in the compartment below, the smoke would not reach the smoke alarm in the one above. There is a huge life risk.

We have different cooking practices. We are a multicultural country and people have different cooking practices using gas et cetera—things that we do not recommend. These things are happening and they are using a lot of oils. So we are experiencing a trend of more fires in units. When you couple that with extra occupant load, and extra fire load—so lightweight materials to make modifications—we have all the ingredients we had for the fire in Bankstown. I attended that and in all my years I had not seen damage to concrete like it from the heat—the spalling. Firefighters with several lines of hose could not get into the front door because the flames were like a

blowtorch with the westerly wind blowing them through. Occupant behaviour, as Adam said—propping open doors—was a key factor in that particular fire. So it is becoming a big issue.

**Mr Dalrymple:** I agree with Commissioner Mullins. We are having the same sort of experience with the international students. They do not understand what the rules and regulations are here and the landlords themselves have a laissez-faire attitude to smoke alarms. It is about making money before fire safety. We are here because of the fire safety issues. Our evidence and fires we have been to suggest that there is a lot of overcrowding and illegal building works going on within these types of tenancies. The only time you find out about it is when it is all going bad. There is no real legislative arena where you can go knock on someone's door and do an inspection, because it is a person's home—it is their own private dwelling—without giving them 24 hours notice. Our experience in that environment is that when a municipal building surveyor has a suspicion that there is overcrowding and this sort of legal activity going on they will undertake to do an investigation. They have to give 24 hours notice and by giving that 24 hours notice when they do the inspection it is spick and span and everybody is out. The students themselves are loath and probably scared to say anything because they will be out on the street.

**Commissioner Mullins:** I want to give an analogy. In this building we do not have to change the smoke alarm batteries or worry about the fire protection—you have lots of important work to do—but in the family home it is up to us and we have to actively do things, so people are expected in their busy and sometimes tragic lives to worry about fire protection in their homes. I suppose our aim, as Adam was talking about, is to have the same regulatory approach across Australia. We believe every person who lives in Australia should have the opportunity to live in a safe home.

The fire fatality problem can almost be engineered out. In Scottsdale, Arizona, from 1986, every home that was built there had home sprinklers and smoke alarms. A study in the early 2000s—2003, I think—found at least a 50 per cent reduction in home fatalities, and other studies in the US found 82 per cent. They do not have to intervene, because they are hard wired, they are interconnected and they have sprinklers, and they do not have to worry about it. So it is not front of mind. In our workplaces we do not have to worry about it, but at home we do.

**CHAIR:** It is where we spend most of our time, and our loved ones are there most of the time.

**Commissioner Mullins:** Yes.

**Senator LUDWIG:** Thank you very much for your submissions. One of the things I want to get you to explain a little bit more is the difference between a fire flash over 20 years ago and now—you have said that 20 years ago it took 20 minutes and now it takes something like three minutes—and the impact of that change on why you advocate photoelectric smoke alarms. I assume they are connected.

**Commissioner Mullins:** Yes. Thanks for the question. Twenty years or more ago, a normal family home had the big plush chairs that probably had kapok, coconut fibre or horsehair.

**Senator LUDWIG:** I think I remember them.

**Commissioner Mullins:** So the padding and the cushions were mainly natural fibres—lots of cottons, so predominantly natural fibres. Carpets were wool. So a smouldering fire would produce a lot of acrid smoke. We remember the smell, don't we? But it was not particularly toxic, and they took a long time to turn into a flaming fire and sometimes did not progress to the flaming stage. It was 10 to 20 minutes. Now the flashover phenomenon—

**Senator LUDWIG:** It would be helpful to explain it.

**Commissioner Mullins:** Okay. A compartment heats up. A fire starts. It smoulders, becomes incandescent and heats up, and the heat source heats everything in the room, and everything—the paint, the carpet, the furniture—pyrolyses, which means it gives off flammable vapours—hydrocarbons, predominantly. They get to a temperature where it is ignition point. If there is sufficient oxygen, you have what some people call an explosion—it is not an explosion—and there is another phenomenon called backdraft, which is a smoke explosion, I suppose, in layman's terms. The entire room flashes, because everything in the room has reached ignition temperature and everything—the walls, the ceiling and everything—is giving off pyrolysed gases. So that is flashover. Once that happens, our research and MFB research showed in the eighties and nineties that the fire would almost certainly extend beyond the room of origin and consume the entire premises. It would get into the roof space, blow out windows et cetera. So it quickly became untenable.

What we find these days is that typical furnishings do not have a lot of cotton or natural fibres. They have polyurethane foam, and the thermal properties of polyurethane foam in a nutshell, in layman's terms, mean it burns at a far higher heat than wood, cotton or anything else, so very high temperatures. So it heats up the room far more quickly, and even the paints we have on our walls have plastics in them, so they give off hydrocarbons.

Our carpet is probably synthetic and gives off hydrocarbons very quickly; the wool would not have. So there is much quicker fire development, and that is why we are saying that when it is in the smouldering phase is when you have to get the warning, because you might have two to three minutes to get out of the place. So you cannot have a smoke alarm and say, 'When it's flaming, it'll get me out.' It is all too late. By then it is too late.

**Senator LUDWIG:** You went through the Building Code. What I wanted to explore with you is whether you have turned your mind to a different framework to achieve the outcome that you seek. I will give you an example. I suspect the majority of people you meet would simply say, 'It won't happen to me. I meet my obligation. I have an ionising smoke alarm and I'm feeling pretty safe about that, but I've got a busy life and I don't really want to turn my mind to doing all the things I have to do.' The government's perspective is that you have a national construction code, you have the building codes which set out the minimum requirements everyone should meet and you have a COAG process that brings together disparate states and different regions, from as far as North Queensland to the tip of Victoria and across to WA. They all have their own circumstances. You end up with a compromise, but ultimately it is a unified minimum. Then you have states that will implement their own regulations on top of that to ensure some outcome, so you have differences in the requirements between Victoria and Queensland. In a nutshell, that is the framework we have now. Turning your mind to that, what is a better outcome? The outcome we all seek is biosecurity at home. If there is a fire, then egress as quickly as possible to minimise damage to the home or extinguish the fire and certainly save life. They are the imperatives.

**Commissioner Mullins:** So different options?

**Senator LUDWIG:** Rather than having a building code with a COAG process, rather than having states putting legislation on top of that and rather than having yourselves simply advocating into an area which then says, 'It won't happen to me.' As good as that is, your message is getting there but not enough. We have examples in the past—seat belts is one. The first car I would have got into did not have a seatbelt. Now I would feel quite uncomfortable if I did not have a seatbelt on. Now you have cars with airbags and an ANCAP safety rating. Things have changed in that area to protect us, but, if you compare that to fire safety, it is probably not getting any better with the advent of modern materials and flashovers now happening in three minutes and not 20 minutes, you might come to the conclusion that, although the interventions of people having smoke alarms is certainly helping some, we are not on a continuum.

**Mr Yaxley:** In answer to the latter point that you make, since the introduction of compulsory smoke alarm legislation in Victoria, we have seen a halving of the rate of smoke and fire related deaths. That occurred in 1997. Over the same period you have not seen a halving in the number of motor accident deaths. I offer that to you as an initial concept. Also, there is not the great variation in the built environment around Australia that you might see in other areas the same size. A common approach is of great benefit. Housing in Australia is not so greatly variable that a common approach will not be effective. As an alternate view to this, we should be thinking in a different way, as you have suggested. Why shouldn't all Australians have access to this high level of security and safety from fire when it can simply be provided at very little additional cost?

**Senator LUDWIG:** I agree. How do we move the authorities? Is changing the Building Code the successful way, given it is a COAG-driven process, and you have to get the states, territories and Commonwealth to agree, you have to have it top-of-the agenda for people to consider it and you will have a population who will consider that they have ionising smoke alarms?

**Mr Dalrymple:** We understand the process that you are talking about with proposals for change to go into the Building Code, and it does take time. Our experience and AFAC's experience with putting up proposals for change is that sometimes they are top of mind and then, after a period of time, there might be 60 proposals for change up for review and then, if nothing is being done, it will drop down the list.

I think there is a bit of a general acceptance—which is, I think, wrong, from the community's perspective—that people do die in fires. But the prevalence of it is way, way less than we see with road trauma, and road trauma is front of mind all the time. That is why you might see that the ADR rules do change, and there has been significant impetus for that to happen. From a fire services perspective, we see that fire alarm fatalities are not acceptable at all, and we do see that there is opportunity, through this inquiry or through other avenues—if there is a better way to do it, and it is a cheap option, we should pursue that.

We know that changing the BCA can be a cumbersome process. There can be variations to Australian standards, and we can have variations to Australian standards and brand new standards written and adopted—and I will give you an example. The Australia standard for sprinkler protection is AS 2118. In the Building Code of Australia right now I think it is the 1997 or 1996 standard. There is a 2011 version that still has not been picked up by the Building Code. Rationale for that might be that, through the COAG process, it is a little bit too costly for that to happen. We understand the triple bottom line and all those things, but it is a significantly safer piece of

legislation that should be picked up by the code, but it does not get picked up. So people are utilising old technology in new buildings, and the effectiveness of that technology is not where it should be. What we are saying is that it is exactly the same with smoke alarms. We can change AS 1670 and we can change AS 3786—I think that is about smoke alarms, but then, again, those changes have got to be picked up by the code.

There are a lot of different ways of doing things, and that is probably the rationale behind why different states have different legislation. If we have a nationally consistent position which talks about the types of smoke alarms, the maintenance of smoke alarms, where you put them and who gets them and other systems in place for the community care aspect of the vulnerable, and if that is all picked up, I think we will have a much, much better outcome—and this can all be done. Most smoke alarm legislation is retrospective at the moment, which can be costly and difficult to achieve. But I think, from our perspective, being fire services, we do not accept that fire related fatalities should be the norm.

**Commissioner Mullins:** Senator, I think what I am hearing is: how can we get people to change at all levels?

**Senator LUDWIG:** It is change in behaviour.

**Commissioner Mullins:** Yes.

**Senator LUDWIG:** It is not the actual fatality rate of vehicular incidents but behaviour changed. In other words, there was a behavioural change for motor vehicles. There is behaviour change even for people who smoke. We recognised the health hazards of that, and the incidence of smoking has significantly decreased. These are all difficult things to progress, but they are generally not simply one community awareness program. They are usually a multifaceted approach to achieve a result. What I am hearing from you is that the community awareness and introduction of the link ad for smoke alarms has brought significant change. It has halved it, and those people who have been pushing that for a long time can be congratulated for that. But you are now telling me that you can reduce that significantly by the introduction of a uniform code, if we want to call it that, and you advocate the correct types of installations to improve outcomes significantly, given the changed built environment that we now live in.

**Commissioner Mullins:** Yes, thank you for clarifying that, senator. I believe there has been societal change. They do expect smoke alarms—although what I also believe is that most people in the community do not realise that probably the majority of alarms are not providing protection, because the battery is flat or it is an ionising alarm or they do not have enough of them or it is up one end of the house and they are sleeping there and if a fire starts in the middle they will not hear it anyway if it goes off and by the time it goes off it is too late. So there are a whole lot of behavioural issues as well.

I would note that in New South Wales our regulations changed in 2006 off a horror year for multiple fire fatalities in 2005. We had 34 fire fatalities in 2005 and then, after retrospective legislation that said every home, not just new homes, must have smoke alarms, we had 14 in 2006. Ten years down the track when those batteries are going flat, we are seeing a trend upwards in fires. As I said, 46 per cent of premises had no smoke alarm or no working smoke alarm and six per cent of premises we are not sure—so probably more than half. Only 38 per cent of homes of disadvantaged people actually had them. We could just say, 'Let's build more fire stations and cut the response times to two minutes,' but that relies on you getting the call. You might get there in two minutes, but the fire might have been going for half an hour and so it would be too late for the occupants. We could give out free batteries, but then, if people are aged and infirm and cannot climb a ladder or live alone and do not know how to ask for help, that is not going to help them.

We do believe in that that uniform regulatory approach across Australia. My experience is that the community appetite for change is often off the back of a tragedy, as in 2006. In New South Wales after the Quakers Hill Nursing Home fire, we retrospectively put sprinklers in. Victoria did it some years earlier. In Queensland there was the fire in a boarding house shared accommodation. So it actually often takes a tragedy to move the community and their representatives.

Bureaucratic processes hamstring us such that the process of changing the National Construction Code, as Adam said, is laborious. There was a regulatory impact statement into residential smoke alarms in October 2012, and it found that the net economic benefit did not warrant changing things. But full points to the Australian Building Codes Board, who said, 'No, life safety is something that people deserve,' and so they moved on the interconnection. We, of course, in our role strongly advocate for that community protection, and as I said, I think while we have to have individual intervention, they may not work. So let's put in more devices because just one per floor is not enough. We have people dying even though they have alarms going off. The alarms need to be interconnected, hard-wired or at least have a 10-year lithium battery that they cannot tamper with. So you can have an engineered risk result here. Sprinklers are cheap. The part 5 sprinklers are about \$1,400 per home in a

new home. Sprinklers are a very cheap thing in building a brand-new home. In the US studies there was an 82 per cent reduction in fire fatalities. Last year about 100 people died in fires in Australia, so you might get that down to 18.

**Senator LUDWIG:** Forgive my ignorance, with the fire sprinklers, do they have a different way of getting set off?

**Mr Yaxley:** Heat.

**Mr Dalrymple:** Yes, they are a detector. They work on heat.

**Mr Yaxley:** If you look around the room at what is near the corners here, each of those is a sprinkler. They have a heat sensitive plug in the centre of them and once it reaches a certain temperature where they are that basically—

**Mr Dalrymple:** The bulb breaks.

**Mr Yaxley:** Yes, the bulb breaks and water comes gushing out of it.

**Senator LUDWIG:** That is what I thought. So a flame or a significant heat source is required?

**Mr Dalrymple:** Mainly heat. They will operate on heat and there may be flames as well. In the MFB we had a prop which would demonstrate the effectiveness of a domestic smoke alarm. You would get a little rubbish bin in a little caravan and you would light a bit of paper in the bin. There was one sprinkler head and one smoke alarm in the caravan and you would look through it like we are looking through that window there. Within a minute, the sprinkler head would activate and extinguish the fire in the bin. That is typical of the way they work. They are a life safety system, the system that Greg is talking about, as opposed to a property protection system. They are fast-response heads and they deliver an amount of water to extinguish a whole lot of fire and keep it in check until the occupant themselves can intervene or we can intervene. That is how they are designed.

**Commissioner Mullins:** Would I be able to leave a DVD that you may have time to look at at some stage? It is very short; it is about four minutes. After that Quakers Hill Nursing Home fire we conducted research. We set up two shipping containers that were identical and set up a room from the nursing home with the same furnishings. One had a sprinkler and one did not. We lit the fire the way we determined the fire had been lit. The one without a sprinkler was totally burnt out; the metal was melting on the bed, which is what we found at Quakers Hill. No-one could have survived. The other one with the sprinkler went out—I forget in how many minutes, but it put the fire out. An occupant may have got some slight burns if they were on the bed, a little bit of smoke inhalation, and maybe a cold from getting wet, but they would have survived. It was very graphic. I had to speak with our ministers for aged care and planning in New South Wales, and with industry groups. There was a lot of argument—'No, these things don't work'—and I just played the video every time and the room went silent. It might be very useful for you, if I could leave that.

**CHAIR:** Yes, you can table that if you like. I would like your response to something that the Australian Building Codes Board said with regard to the Building Code. It said that the Building Code of Australia is a minimum standard and it is inappropriate to include a huge level of detail in it with regard to smoke alarms. What is your response to that comment?

**Mr Dalrymple:** I did read the same submission, and I do not agree with their comment. We understand that it is a minimum requirement and that states and territories and individuals can go over and above. The Department of Health and Human Services in Victoria do that on their own because their clientele is all aged care and people who are vulnerable; they have their own standards that are way over and above. The issue for us here—and Greg alluded to it earlier—is that if you are in a class 2 building or a class 5 building or a building like this, then you have plenty of protection and you are relatively safe; however, the evidence in Australia suggests that you do not die from a fire when you are at work, that you die at home. I will just go back to what I said before: we believe that we do need some national regulation here that is consistent across all boundaries within Australia.

**Commissioner Mullins:** I think the Australian Building Codes Board—I disagree totally with that comment, because they will specify the strength of walls, elements of construction that hold a building up so that it does not fall down, the roof, weatherproofing, domestic water supplies et cetera. We would say the fire services provided can also be specified that stringently, and should be. In defence of the ABCB, they are looking for evidence on which to base their decision. They are working with Fire and Rescue New South Wales, the University of New South Wales and the CSIRO. We conducted our research burns earlier this year; we are going to conduct another 90-odd research burns in the new year to get the repeatability. The ABCB are helping to fund that because they simply want the evidence. I think they have an open mind. We believe that will provide the evidence, given our experience so far, but I am disappointed in that comment.

**CHAIR:** Surely there is enough evidence out there? Are you suggesting that they are not convinced yet?

**Commissioner Mullins:** To a scientific standard. I would rely on the NIST reports from the US—there are others from Norway; there are a lot of studies. If we have to do more, we will do more. I am a commissioner of a fire service, I have been around the world, I have worked in the US, in Los Angeles, and in the UK: there is enough evidence there for me, but I am not an expert. I just know what fires do. However, I do understand the regulatory environment, the number of stakeholders involved who want to reduce costs and do the bare minimum in some ways. You do need evidence to move those people, so we will work with them to provide that additional level of evidence.

**CHAIR:** Why do you think ionisation smoke alarms are still being used in Australia and are considered acceptable?

**Commissioner Mullins:** They should be banned.

**CHAIR:** Why do you think they are acceptable as far as the building code is concerned?

**Commissioner Mullins:** They meet a flawed Australian standard testing regime.

**Mr Yaxley:** And there are still stocks of the product.

**Mr Dalrymple:** You can have them. The code allows it and so does the Australian standard. We are saying that the standard itself is flawed in the results that it provides.

**CHAIR:** We have run out of time, but I want to get your opinion on the education side of things and whether you think we need to do more and whether you have some ideas on what we could be doing to hopefully prevent fatalities?

**Mr Dalrymple:** There is a current coronial inquest just about to go to the Victorian coroner on a recent fire. Some of the recommendations that we are looking for from the coroner talk about this very thing—education and helping people to help themselves. We are looking at the feasibility and availability of smoke alarms themselves. When we talk about education—and it goes back to what I had in my opening statement about community care—we either regulate or recommend that the providers provide training to their staff so that they have an awareness of what a smoke alarm is, what it does and how it can be tested so that they can help the people who are vulnerable.

Every fire service runs their own education campaigns and we will continue to do that relative to the safety of smoke alarms and that type of thing. What we would like to see is that that is picked up by other jurisdictions as well. We are quite happy to help departments of health and human services and those types of agencies to promote smoke alarm safety and to provide documentation that is readily available now. You probably have the AFAC one sitting right there. It is about the essentials—a basic home fire safety kit, which tells you how to look after yourself. Education is one thing, and I know that the ABCB document talked about that, but we believe a national approach plus education will probably go a long way.

**Commissioner Mullins:** We are following New South Wales. We are targeting home fire safety visits. We correlate our fire incident data with census data—socioeconomic status. We find there is a direct correlation, so we target those suburbs. When a fire occurs in a home, we find that is when the awareness is highest. So we letterbox drop and say, 'Firefighters are going to come and visit.' We find they are waiting with open arms and they say: 'Please come in. What can we do?' The awareness is the highest straight after a fire. That is just human nature.

The other thing is children are very impressionable and pick up the messages and they will go home and drive mum and dad mad until they get a smoke alarm on the ceiling and do a fire drill. We really target children. Frankly, as a fire commissioner, I should be measured on that through the RoGS process and we should be pushed to do more of it rather than just focusing on response.

**CHAIR:** We have run out of time. I want to thank you very much for coming along. Once again, thank you for the contribution you provide to the communities of Australia.

**ORR, Mr Christopher Charles, Technical Director, Fire Protection Association Australia**

**WRIGHT, Mr Matthew, Chief Technical Officer, Deputy Chief Executive Officer, Fire Protection Association Australia**

[10:09]

**CHAIR:** Welcome. The committee has received the association's submission and is published as submission No. 18. Before I invite you to make an opening statement, do you wish to make any amendments or alterations to your submission?

**Mr Wright:** No.

**CHAIR:** Do you have any comments to make on the capacity in which you appear?

**Mr Orr:** I am also the independent chair of FP2, which is the standards committee that writes the smoke alarm in the 60-70 part 1 standards.

**Mr Wright:** Thank you for the opportunity to appear before you today. FPA Australia is the peak national not-for-profit association for the fire protection industry. Our vision is leading and supporting a professional industry to minimise the impact of fire on life, property and the environment for a safer community. FPA Australia members cover all the sectors of the fire protection industry. The association is involved in the development of, and advocates for, continuous improvement of legislation, codes and standards and provides guidance and education independently to pursue our vision—free of bias, coercion, favouritism and external commercial interest.

As comprehensively discussed in FPA Australia's submission—researched and prepared by our technical officer Ian Findlay in response to the terms of reference for this inquiry—we make a number of observations. Firstly, anecdotally there is agreement by fire services across the world that smoke alarms save lives and are one of the most significant fire safety advancements in a generation. I believe that point was also made by the fire service, who gave evidence just before us. Both photoelectric and ionisation smoke alarms have delivered this advancement and alerted occupants to fires they may not have otherwise responded to.

The purpose of smoke alarms is to detect fire in its initial development stage and to provide early warning of a fire to allow occupants to escape. The type and installation of smoke alarms and the type of fire directly impact on the delivery of this performance objective. Smoke alarms do not provide fire suppression.

For new residential buildings the requirements for smoke alarms are fairly consistent, as each state and territory's building legislation adopts the Building Code of Australia. The retrospective regulatory requirements for each state and territory for existing buildings are unfortunately not nearly as consistent, and this is highlighted in detail in FPA Australia's submission. All Australians in residential buildings should be afforded appropriate smoke alarm protection. The following improvements can be made to current regulatory requirements. All residential buildings should be fitted with photoelectric smoke alarms in the first instance in order to treat the highest fire safety risk in residential buildings. Ionisation smoke alarms are effective in detecting fast-flaming fires that contribute to some of the fire risk in residential buildings, which would only be considered supplementary to photoelectric smoke alarms. Smoke alarms should be required to be provided in sleeping areas and paths of travel. This position was documented publicly by the Fire Protection Association Australia's position statement PSO1 published in May 2011. I do not think that was attached to our submission, so I will provide it subsequent to this, if that is acceptable. A single national standard, potentially a revised version of AS1670 part 6, detailing the installation requirements, should be adopted by all jurisdictions for new and existing residential buildings to ensure smoke alarms detect smoke early and alert occupants to allow them to escape before suffering the effects of fire.

Education of the community and end user is extremely important. There is a need to ensure that the right technology is provided in the right place and installed and maintained by people who are competent to do so. There is also a crossover to the non-conforming products in an inquiry into this issue in the sense that smoke alarms available for sale in Australia must be demonstrated to be fit for purpose.

FPA Australia has read the submissions that were made at the first hearing in relation to this Senate inquiry and would like to make a couple of observations. FPA's position is that ionisation alarms are not defective and do not fail relevant Australian standards or international tests—and Chris will elaborate on this further. 1670 part 1 2004 did not ban ionisation alarms. The standard required is photoelectric alarms where the design involved the need to detect obscuration from smoke—that is, sleeping areas and egress paths. Ionisation alarms are smoke detectors. They do detect a form of smoke. However, FPA Australia's position is that all residential buildings should be

fitted with photoelectric smoke alarms in the first instance to treat the highest fire safety risk in residential buildings.

There are a number of factors that impact on the performance of motion alarms. First is the type of fire smouldering or flaming. Second is the type of technology—photoelectric or ionisation. Third is the installation location, whereabouts they are placed in the home—in egress paths, in areas where smoke will actually reach them, in areas to avoid false alarms and in areas to ensure early warning, so that the sound that they emit is actually audible to the occupants. Fourth is the power source, whether they are hard-wired, have a 10-year non-removable battery, have a replacement battery and the backup battery requirement. Fifth is residential risk factors. How we live in our homes is very diverse in Australia, probably more so than any other country, given our multicultural nature. Lifestyle, culture, occupant characteristics, type of construction, contents, furniture, appliances, electrical heat sources, the state of consciousness and alertness of occupants, and ignition sources all impact on these factors. Sixth, as I have sort of mentioned, is the warning audibility—the volume and interconnection of alarms. Seventh is the maintenance, and working smoke alarms is obviously a theme that the fire services promote nationally, which FPA Australia supports. Eighth is the available time that they provide you to egress the building—and the egress tenability is what we are after.

The last point I would like to make is that, even if we get the technology right about smoke alarms, they do not provide any automatic suppression, and I believe that residential sprinklers are an element that we should be discussing as part of this inquiry, to complement the early warning that smoke alarms provide. By ensuring that legislative requirements are provided for both new and existing residential buildings, detailing the necessary requirements to ensure smoke alarms are installed appropriately and they achieve their purpose, state and territory governments can locally reduce the smoke and fire related injuries and deaths and associated property damage that all residential fires cause. Thank you.

**CHAIR:** Thank you, Mr Wright. Mr Orr?

**Mr Orr:** I suppose I am the one that needs to answer the question about the standards, since that has been raised a number of times. The point I would make here is that a smoke alarm is a product. It is a detection device. The standards that test these devices recognise that they test different types of phenomena. So, if we are testing a photoelectric detector, it will be tested by a phenomenon that would give you a smouldering fire, and its response would be measured against that. In the case of an ionisation detector, it is a totally different type of fire. The particulate matter that we are trying to detect is different in both cases.

Smoke alarms are not typically made here in Australia. They are an imported device. Overseas, they run smoke alarms as they do smoke detectors. This test regime applies to the same detectors that are in this building as would be in your home, so the test regime does not change. What they do is they have seven different test fires and they run the devices through these test fires and, depending upon which ones you pass—if you pass the flaming-type fire testing, then you are an ionisation; if you pass the smouldering, then you are a photo. That is typically how they are assessed.

The test here in Australia, the AS 2362.17 test, is a smoke room test. It is not an assessment of the device's ability to work in your house. It was never intended to be. It was developed back in the eighties, when we first had the Australian standards here for smoke and heat detectors. In that particular room test, we have a large room like this one here, and a small piece of masonite—half the size of the thing we have got our papers on—is placed upon a 3.6 kilowatt bar radiator, in effect. It is then tested, and it is actually a smouldering smoke test. Where we get the confusion, and the reason we wanted to raise this, is that the issue is not ion versus photo, in essence; it is what we are trying to detect and what is the most appropriate thing to detect that.

In that room test, it has been raised a number of times here that the ionisation detector fails, but it actually does not, because the measurement in that test is two different things. I can share with you some of the numbers off test reports. It has been raised by others. I can confirm with you for you that a photoelectric detector in that room test would typically go off at around the eight per cent obscuration level, which is quite low. In the same room, under the same test, an ionisation detector goes off somewhere between 48 and 56, which means you are going to have a very hard time seeing your way out. That does not mean it fails, because obscuration is not the measure of its test. There is a separate set of values that go in there. What we are doing in this part of this debate is we are applying an obscuration test, a photoelectric test, and trying to apply it to an ionisation, and it will fail every time. It has to. Equally, if I applied a photoelectric to an ionisation test, such as, say, burning methylated spirits, because there is no smoke given from it the photo will fail. So you could use the reverse logic.

The issue for us is not a case of whether this thing is defective or otherwise; it is whether or not it should be used. The other issue that was raised was that FP2, when they did AS 1670.1, which is the commercial design standard for this building here and similar buildings—for anything other than a domestic dwelling—banned

ionisation, and that is not the case. What we did was recognise that the most likely design fire for a bedroom is in fact the smouldering fire. Therefore if you look at the two technologies available and I wanted to detect a smouldering fire, I am not going to install an ionisation; I am going to install a photoelectric.

The standard mandate within sleeping areas was you had to put in photoelectrics not because they are a product that did not work but because the fire that we were trying to detect was a particular type.

Equally, in corridors, the issue is obscurity. If I get an alert, I get woken up and I want to find my way to the exit, I have got to be able to see the exit. At 50 to 60 per cent obscurity, if an ion did go off, then you are not going to see it. Again, it is not fit for purpose. The thing that we are trying to bring to the table is: we need to look at these detection devices in terms of fitness for purpose and we do that every day of the week when we start to look at commercial buildings. We just do not seem to do it when we start to look at residential buildings.

The analogy I would give is: it is like having a set of golf clubs. In the commercial arena, we have a myriad of different detection devices that work in marvellous different ways. Five or six of them detect smoke of different kinds, and we choose those when we do the design to be the most appropriate for what we are trying to do and what we perceive to be the risk and the threat and where we are going to place that detection. We do not do that in residential, unfortunately, and that is part of the issue. We have not brought the paradigm down of this design concept to look at the risks inside domestic buildings, and that deals with the issues that Matthew raised such as: what do I use; where do I put it; if I put it there, will it false alarm; if it false alarms for sure, it is going to be disconnected; and will I even hear it? It is no good putting it down the other end where it goes off nicely, if the person is at the other end of the house and cannot hear it.

It is not simplistic issue; it is complex. One of the issues that we want to raise here is that it is a complex issue: it is not simply about banning one thing; it is about looking at what we are trying to get out.

**CHAIR:** I think the evidence would suggest that smouldering fires are more prominent in residential homes than the other type. I get a bit worried when we start talking about the technicalities. I am not across all of it. As an ex-footballer, I copped a few beltings around the head; however, the motivation for this is that I honestly believe that photoelectric smoke alarms are a better product for households. We can get into the technical side of where best to put them but, at the end of the day, what we are hoping to achieve is an alteration to the building code to make it compulsory to have photoelectric smoke alarms installed. I think that will save lives.

**Mr Orr:** I agree with you 100 per cent, so do not for one minute think that I am trying to defend ionisation technology; we just need to understand that it is not defective. It has a particular usage, which in many cases in residential is inappropriate. FPA does support that the minimum requirement for the BCA be photoelectric. Just to give you my personal view on that, I have six smoke alarms in my house and they are all photoelectric.

**CHAIR:** One of the things that has come out of the Brisbane hearing and again here today is that, overall, Australians are fairly lackadaisical about their fire safety. We put in burglar alarms. We make sure we lock our cars away. We are all very conscious of those sorts of things, but what I just cannot grasp is the fact that we have a product out there that is far better than what most people are using and it is not being encouraged. That is the issue I have.

I do not necessarily want you to comment on it—this is what I believe. In your submission you provide a very detailed outline of a smoke alarm regulatory regime in Australia. Do you believe that consistency in smoke alarm regulations across Australia is necessary?

**Mr Wright:** Absolutely. I think that is our biggest concern. Picking up on what you just said, Senator Lazarus, in relation to the lackadaisical attitude, once we have people to this point where they accept that they might need to do something about fire protection in their home the worst thing we can do is to have different views on what that should be. We need to have it one way across the whole country. Unfortunately, Australia's population is not big enough to be able to accommodate variations in that approach for all states and territories. For the best part, the Building Code of Australia has done a wonderful job in uniting construction requirements consistently across the country, even though there are some variations. The thrust of why we put so much effort into detailing this in our submission is that the Building Code of Australia only applies to new building work. It is not retrospective. The states and territories use their own. From a constitutional power point of view, are forced to have their own legislation in relation to what they do with existing buildings. They have introduced that at different times; they have different requirements. We submit that whether you live in the ACT, WA or any other jurisdiction in Australia, you should be afforded the same minimum requirements in relation to fire protection and, certainly, in relation to smoke alarms, which are the front-line defence in relation to fire safety in people's homes.

We agree with much of what the brigades have just submitted to you in their evidence. We work very closely with them. The test that Commissioner Mullins was talking about in relation to the Quakers Hill fire, FPA

members provided the equipment and time to get those tests to occur. We are on the same wavelength with the brigades in relation to fire protection outcomes. Certainly, our vision in terms of protecting life, property and the environment is as aligned as it could be with the brigades' objectives around the country. This is one of those situations where we have taken a long time to get a National Construction Code together. That has had many benefits for the construction of new buildings. From a bureaucracy point of view, we see that lacking in the states and territories. Fire protection is an acute area. Commissioner Mullins mentioned about the Quakers Hill fire. We had to have an incident for the New South Wales government to want to respond and to require sprinkler protection in aged care homes retrospectively when Victoria had a similar incident back in 1993 and had done the same thing. Why is the life of a grandmother or grandfather living in New South Wales any different to someone living to another state or territory?

So, when it comes the smoke alarms, absolutely we think there should be consistency and one approach. You would see in our submission that, from an education point of view about the type and installation requirements for smoke alarms, we have submitted that we believe AS 1670 part six is the appropriate Australian standard which should be updated and then put out as the national document that all states and territories would simply adopt for existing and new buildings. We need to get some consideration of those happening at the same time rather than separately.

**Mr Orr:** On Matthew's point, in terms of the building code, we have made measures there. In terms of the commercial side of it, we fixed that within the standard to take away that flexibility. It was fixed in that manner by mandating photoelectric in those particular environments. I think we could do exactly the same with the building code as well in terms of the minimum requirement. If you are going to have the minimum requirement—and this is the FPA position on it—that minimum requirement should be photoelectric. You might put a heat detector in other locations as well, but that minimum requirement should be photoelectric.

**Mr Wright:** I just need to add something there, too, if I can. The Building Code of Australia is a performance based document. It would take me a long time to describe the whole virtues of what that really means. I am sure you can ask the ABCB about this later this afternoon when they provide evidence. The prescriptive requirement—so if you think of a recipe approach: this is the cake; this is the recipe I do to produce the cake—is only one of the options in the National Construction Code. You can develop what is called an alternative solution approach, but the performance requirement, which is the objective, is very clear about the life safety objectives of the code. This is a life safety code. It is not about property protection. That is why sometimes in the fire protection industry we have trouble getting the code to change to what we see is best because some of the things that we propose also result in property protection outcomes. The code is focused on life safety only. We would submit that life safety in people's homes, where most of the fatalities actually occur in this country, should be the No. 1 priority.

**CHAIR:** You have probably answered this question, but do you believe the Building Code requirements dealing with smoke alarms need to be amended?

**Mr Wright:** I think it needs to be improved, yes, and it needs to clearly articulate, where the prescriptive requirements are used as an option, that photoelectric smoke alarms should be the first option in your house.

**CHAIR:** Good to hear.

**Mr Orr:** The installation requirements for smoke alarms are at this point in time contained within the Building Code itself, so it refers to the product standard and then it gives you the guidance on the installation arrangements. Whilst they do in fact have guidance information as to the difference between the types and other information for installation, one of the proposals we had here was to make that simpler by simply doing what we did with 60 and 70 part 1 and having a national standard that would deal with the installation of smoke alarms and the associated issues within residential accommodation, and that would become an all-inclusive document.

**CHAIR:** What I am hearing is that, in regard to smoke alarms, the Building Code is probably a little dated and needs to be brought up to speed?

**Mr Orr:** Yes.

**Mr Wright:** Yes. I have to curse this by saying that it is anecdotal rather than based on any hard evidence, but my general understanding is that the introduction of legislation for smoke alarms was something that was hard-fought, especially for existing buildings, because we do not have many retrospective regulatory requirements for what people do in their own homes. At the time that it was implemented for most states and territories, there was a question about the economic impact, as there always is. At that time, ionisation alarms were far more affordable than photoelectric alarms. In the 10 to 20 years since that legislation was promoted, we have seen that the cost disparity has reduced and now there is not too much difference between the technologies. So that would probably inform any new regulatory impact statement that needed to be done under the auspices of changing the Building

Code. I think the Australian Building Codes Board is bound by the expectations of the intergovernmental agreement with the states, the need to provide the minimum code and satisfy the objectives of the Productivity Commission in what the cost-benefit is. They are obviously always pretty concerned about what cost implications there are. We would suggest that those cost implication barriers, without having done the analysis, are not what they used to be and should not be a barrier to life safety.

**CHAIR:** What role do you think the Commonwealth could play in regard to getting the Building Code changed?

**Mr Wright:** From personal experience, having attended the last Building Ministers' Forum in July, someone made a comment to me subsequent to that that Australia is almost the 'United States of Australia' in the sense that the Commonwealth sits over it. I think we all understand what the framework is there. I think the Commonwealth's role here would be to encourage the states and territories to amend their legislation for existing homes to be consistent. They have already agreed, by intergovernmental agreement, to adopt the Building Code, so whatever changes in the Building Code for new buildings they will adopt automatically. States and territories still have an option to vary that, but I would be surprised if they did. I think the Commonwealth's role here is to say to all the states and territories: 'We need to do this one way. This is the best way of doing it. It will be documented and it should be promoted through the country the same way.'

**Senator LUDWIG:** In terms of the best way forward, do you still think, having experienced the regulatory processes to date, that sticking with the current system is best, or do you think there is an alternative way to pursue improved outcomes? I thank you for your submission; it is very comprehensive. I think it leads to where everybody seems to suggest. When you look at all the submissions, within degree, they all come to the same conclusion—that we need a regulatory framework, we need education and awareness, we need to head towards photoelectric, and we need interconnection and perhaps a bit more. So we already know what we want. How do we get there?

**Mr Wright:** There will be no change unless there is regulatory change, and the reason I say that is that every fire service around the country, FPA Australia, community organisations, healthcare departments and others all have their own information or education that they promote about smoke alarms. There is a very comprehensive campaign produced by the brigades about making sure that you maintain and change your battery in your smoke alarm, and despite that we are still in the same situation that we are, because there is not one unified spot to go back to.

I had an experience last year when one of our members brought to our attention the different information that multiple real estate agents were providing to tenants of buildings in relation to smoke alarm legislative requirements, and all of the information that I have looked at—which is probably from three to six different sources—had some elements of truth in it and some elements of not really piecing together what was required. It would seem that all the stakeholders in the process would need to be on the same page to get the objective that we want. I do not think that the regulatory change is the only element. It is the key one, and if we do not get the change we will not see the consistency we want. But certainly the funding of educational campaigns is something that would need to support the regulatory change and also support the change in attitude and profile—that this is an important issue not just for homeowners, which most of the legislation is targeted at, but also for any occupants or tenants of buildings and the people that are maintaining and servicing those buildings—so that certainly the industry that is producing the product understands what the expectations are nationally. So any support that the Commonwealth can provide in funding educational campaigns nationally will support that legislative change, I think.

**Senator LUDWIG:** Thanks very much. What do you think is the best regulatory framework to achieve that result that you talk about?

**Mr Wright:** FPA Australia completely supports the approach to the National Construction Code, but Australia will always be hamstrung constitutionally, so that code can only deal with new buildings going forward unless there is a change to the intergovernmental agreement which also allows ABCB to deal with existing building stock in the states and territories. I do not think that is going to happen anytime soon, and the states and territories will want to keep their sovereign right to do that. I guess COAG and the Building Ministers' Forum is the right—

**Senator LUDWIG:** Can I stop you there for a second. This is, I guess, the nub of the point I am trying to get to. I will let you finish shortly, but it is possible. You have uniform corporations legislation in this country. Prior to 1961, every state and territory had its own regulatory regime for regulating corporations. You now have a couple of templates; corporations is an early one, but it is not the first. There are two or three distinct models where states and territories and the Commonwealth can have a single regulatory framework that improves

whatever outcome it is that it is designed to improve or have a consistent application with. Have you turned your mind to that question about what a regulatory framework that would achieve your result would look like? Forgive me for this: if you continue to say, 'Well, we've got a good national body, but gee I wish the states would come on board or the COAG process would push the states to adopt one regulatory framework or the states would individually have retrospective legislation,' we will be talking about that for the next 20 years, I suspect.

**Mr Wright:** I understand. For someone like me, who—I am sure this is not dissimilar to you—spends a lot on aeroplanes, conducting consultation with all the different states and territories, it is very easy to say that FPA Australia would love to be able to go to one destination to speak to government in relation to fire safety regulation. If we could make that happen, that would be, I think, something that would be a good outcome not only for the association but for the industry and the community as well, to get some consistency around the country. That would go to the depths of not only the requirements for fire safety but also the enforcement expectations for fire safety and how that is conducted, because, no matter what applications we require through regulation for fire safety to be installed in buildings, if those regulations are not enforced then we may never realise the benefits of them in the first place. If there is any opportunity to have a national discussion on fire safety beyond just new buildings, also including existing buildings, and treating that one way nationally with legislation, that is something certainly FPA Australia would be supportive of.

**Senator LUDWIG:** You are not advocating a particular model or a particular scheme that would encourage an outcome along those lines? As I am digging a little bit harder—please forgive me for it—we did not get a Corporations Law applicable throughout the Commonwealth by hoping that we could achieve that. There was a significant push by industry and business to get that and there were imperatives—states do not easily give up their legislative authority, unless they see a real need. One of the issues is that we talk about uniformity, we talk about an education outcome for fire safety and fire awareness to save lives, which is imperative, but we do not have, as far as I can detect, unless you can point me to it, a unified approach across the board to achieve a unified model. That is a different campaign. Governments will simply say, 'Existing framework, keep pushing'.

**Mr Wright:** I can provide some information separately after today which might be useful in relation to the development of the Australian building codes—I am sure they can too. That was I guess the result of the type of model you are talking about that was proposed about saying we need some uniformity and really has delivered that but only for new buildings. To answer your question, Senator Ludwig, no, we have not spent time considering what a model would look like to treat fire safety beyond new buildings and into existing as well and capture those issues. That is not to say that we could not and could not provide that separately, some ideas. The work that happened in the late eighties to develop what was the first version of the Building Code of Australia went along those lines and I know there was a lot of constitutional navel-gazing about how such a document could be produced for this country and the microeconomic reform benefit that that would provide. We could look along those same lines about what an approach might be to fire protection because we are passionate about those outcomes being same. And I agree with you—hoping that will happen is not enough. We have not seen that potentially that was an option beyond what the terms of reference were for this inquiry but we are more than happy to consider putting something to you that would express that.

**Senator LUDWIG:** The case I was just trying to explore with you is where you are up to with a very passionate issue. So do not take it as a negative.

**Mr Wright:** No.

**Senator LUDWIG:** I have listened now to many submitters, plus I have read submissions and loosely everyone is on the same page and loosely we are running into the same obstacles. We have come a long way but we have not finished the journey and as technology changes we are not keeping up with it. That is a broad generalisation but it seems to be photoelectrics were expensive, economics might have pushed you into ionising. The best available data at the beginning was that ionising, smoke alarms save lives and they have. Now with new technologies, with photoelectrics price coming down and, lithium batteries a whole different story starts to emerge and we are now trying to catch up with that, it seems to me. What we then run into is a regulatory framework which does not help that.

**Mr Wright:** It certainly does not help for the existing building stock and that is the big point here. In support of the work that the Australian Building Code Board does, the framework that was developed for them to exist actually delivers the kinds of outcomes you are talking about—that we now have (a) a national code and (b) a national code that is performance based, so if a new technology came onto the market you could take advantage of that straight away and take it to market. But we also have some historical and cultural approaches to how we do these things in the country that are now starting to change. The way we used to work with Standards Australia and

have committees standing in perpetuity is being restricted such that, no, if we are going to sit and develop a standard, we need a project proposal with a defined scope and a defined time to deliver an outcome.

**Senator LUDWIG:** That is good news.

**Mr Wright:** Yes. And, no, the Australian Building Codes Board will not just automatically adopt a standard once it has been published unless it meets the criteria that they have for expectations of minimum requirements and the economic review that they need to do. So I think change is occurring, but the takeaway point for me—and, hopefully, for you—from our discussion here is that that change is occurring in new buildings and at the core of our submission beyond the photoionisation debate about smoke alarms is that we have not caught up with that in relation to existing building stock. For every new building that is approved and constructed, it is a drop in the ocean compared to the existing building stock that we have and the fire safety risk that that represents.

**Senator LUDWIG:** I appreciate that.

**Mr Orr:** In that standards development process, 1670 part 1, the new standard, is a large change. We published on 11 December, so it will be the first change of the standard since 2004. It will put into place a whole paradigm shift to the way we have done things over the last decade. Standard 3786 was released in February this year, and the same applies to that. Many of the technology issues are being picked up in those areas, but, as I said before, it is not the technology as such; it is how we apply it, and I think the regulations in that area fall a bit short in how we apply the appropriate technology in the appropriate place. It is a bit too wide open.

**CHAIR:** We spoke about the attitude of people and smoke alarms. Have smoke alarms sort of been forgotten about or put on the backburner? I assume, as we become better and our architects become better at designing and we are building with different products, the standards will be changing to accommodate that, but it appears to me that we have not kept up the pace with smoke alarms.

**Mr Orr:** I think we have kept up. The fire brigade numbers give us a sound indictment of the community in many respects. We might have a 97 per cent hit rate when we first do it, but, two years after that, we have lost many of them. They have been not maintained, the batteries have been removed, they have been damaged or whatever it happens to be. They have been put in the wrong place and have false alarmed and people do that. But there is a natural shift occurring in technology now. It will not occur in the short term in the residential market, but it is occurring. But I suggest that, within two years, in the commercial fire alarm systems, you will not see an ionisation detector at all. The motivation for that is not the fact that the detector does not work. The motivation is the ionisation source inside the detector. Typically, again, because we do not manufacture the products here in Australia as such—we get them from the US or, principally, from the European market—with the European directives in place now it is becoming increasingly more difficult for you to have that type of material in any sort of product. So it is becoming difficult for industry to deal with products that have that type of material, albeit a very minor amount. It is just one of those issues where it has been dealt with now to say, 'It's not nice to have a radioactive source in this area,' and they are being phased out. Within two years, you will not see any commercial supplier of fire alarm systems offering you an ionisation source. There are other technologies coming in that give you the same performance for detecting a fast-flaming fire but do not use ionisation. We have not thrown them away; the technology has just moved on and we have a different way to do it. I think you will also find that, in some respects, that will occur in the residential market, probably within the next five years.

**Mr Wright:** Senator Lazarus, I would like to pick up on your point about the complacency, I guess, towards residential fires and particularly this inquiry. For a lot of people, fire does not happen to them every day, but the brigades will attest to the fact that fires do happen every day. In fact, if any of you watched the news this morning, there was a house fire reported in, I think, Victoria. There was one the day before in Victoria as well. Every time I watch the news, I am always struck by the incidence of residential fires that are reported but almost accepted by the community.

I want to come back to the point about a holistic approach to fire protection. The silence is deafening from Australia in relation to residential sprinkler protection in buildings, especially in people's homes. The US has been very progressive. We have worked with a sister organisation, the National Fire Protection Association in US, the NFPA, who have really supported the adoption of a mandatory requirement for sprinklers in residential buildings in the US, which states have picked up. The Welsh have also done that, and even the New Zealanders are ahead of us in relation to this. I do not think we like New Zealand to be ahead of us in much, so it is something that we need to lift our game on in the fire protection industry.

FPA, as a not-for-profit industry organisation, can only do so much in relation to lifting this, but we have recently made efforts to re-establish a group—previously the Home Fire Sprinkler Coalition, which included us and AFAC and some other bodies—to generate awareness and also develop technical solutions to provide

residential sprinkler systems in people's homes and to reduce the cost of doing that. I think there is a real opportunity for Australia to fill that void. Whichever smoke alarm technology we end up having in buildings, and we hope it is photoelectric in people's residential homes, it will not do anything to suppress the effects of fire. It will only warn you. If you do not hear the warning, the fire will continue to grow.

Commissioner Mullins referenced the Scottsdale Arizona case, which is a very good case study. I think it is 15 to 20 years now that that community has had a requirement for sprinklers, so they have good data that demonstrate the effectiveness. The more we can develop technology the better. The new technology is not about installing stand-alone sprinkler systems; it is about sprinkler systems being tapped off the existing water supply in people's homes and reducing the cost. The water is already in the house; we just do not connect it to the sprinkler heads that would suppress or control the fire.

In relation to other things that the Commonwealth could be doing in the area of residential fire protection, it would be financially supporting the development of those solutions as part of the package for residential buildings. It may be very difficult to do that retrospectively for existing homes, but certainly it is something that we should be turning our minds to for new constructions. Just like we have seen the value of people collecting rainwater or solar power from a sustainability point of view, I would suggest that fire sprinklers are something that sustains life and have immediate benefits for people in their homes. It is sometimes shocking for me, working in the fire protection industry, that we do so much work in the commercial space, but the reality is that the majority of fatalities are in people's homes and that is where we have the least amount of requirements.

**CHAIR:** Baby steps. The first thing we need to do is get photoelectric smoke alarms into houses and then we will go down that path of sprinklers. We have run out of time. Thank you for coming along. It has been very informative.

**Mr Wright:** Thank you for the opportunity.

**COATE, Ms Carmel, Executive Director, National Fire Industry Association**

[11:02]

**CHAIR:** Welcome. Thank you for coming and talking with us today. The committee has received a submission from the association, published as submission No. 19. Before I invite you to make an opening statement, do you wish to make any amendments or alterations to the submission?

**Ms Coate:** No.

**CHAIR:** I now invite you to make a brief opening statement, before we go to questions.

**Ms Coate:** I will not go to the positions that we have put in our submission, apart from speaking generally about the need for national consistency. It would be very helpful if the federal government could urge state regulatory frameworks to join with them in putting together a program that could deliver fire safety to domestic and residential environments of the built environment. Through the National Construction Code, the way going forward, there are already safeguards built into that. But, as I am sure you have heard from others today, the current built environment is not being addressed. Unfortunately for my industry, no-one plans on having a fire; they do not expect to have a fire. When they have the choice of providing fire safety measures for themselves or perhaps buying a new TV or something else that they get more self-gratification out of immediately, that is where their money will be spent.

While I was sitting at the back, I heard Senator Ludwig asking if there were any different ways of approaching this. I think the way is to address it like some of the environmental issues have been addressed in the past.

The NFIA were party to the development of the ozone protection act and they are bringing into light a whole regime of industry, education, licensing and training upskilling to bring reduction of ozone depletion gases. Perhaps in relation to home fire safety, we could come together as government and industry and put together a program that brings to the mind of everyone the need for fire safety minimums in their homes for the built environment.

**CHAIR:** Why do you think we have this attitude in regards to smoke alarms? We put fences around our pools so our children or people do not wander in and drown, and the standards of those are always being updated. In fact, in my state of Queensland, every household that had a pool had to have their pool fence inspected and brought up to standard or there would be massive fines and things at that. We are very worried about our little ones getting into the pool. When we buy cars, one of the first things a lot of people look at is the safety aspect of that motor vehicle. As I said before, we tend to go to top-shelf products or the best products that we can get our hands on when it comes to protecting our homes and our things in our home from burglary but we seem to have this really lacklustre attitude towards smoke alarms. It has been mentioned today that we have this 'oh it will never happen to me' sort of attitude. Why do you think that is the case? What is the reason for the lacklustre attitude towards this?

**Ms Coate:** It is because it is not front of mind. It is not dealing with a comfort issue for today or a needs issue for today. In the commercial sector, many years ago, the insurance industry would charge you one fee if you had no fire protection in commercial industrial buildings and another fee if you did so there was a price differential. That has disappeared so even that cannot be used as a lever to encourage fire protection in domestic buildings. But maybe it comes back to putting in place a rebate on rates or something for those who have life safety measures in their buildings. It is because it is not immediate. No-one plans to have a fire. They all think 'we are fine' but if you look at the bushfire areas, every year the fire brigades and the local councils have to remind people to clear all the detritus from around the house, all the leaves, the logs, the paints that have been stored under the house because it is not front of mind until it happens. Unfortunately, that is the way we seem to be wired. No-one expects disaster to happen to them; they always expect it to happen to somebody else.

**CHAIR:** As an extension of that is the education around it. Again, in schools, we teach kids not to talk to strangers but we do not in schools promote the fact that, depending on what type of smoke alarm you have in your house or whatever, there is a potential for disaster. I guess my question is: do you think we are doing enough on the education side of things and if not, what ideas or recommendations do you have?

**Ms Coate:** I know most fire brigades have a lot of education programs such as the 'drop and roll' to get out of a fire et cetera. I do not believe that that education program goes to what safety measures are at home but maybe that could be added in because there is nothing more likely to pressure parents to do something about their living environment than their children constantly telling them that they need to do something.

**CHAIR:** I want to get a response from you about the Australian Building Codes Board suggesting that the Building Code of Australia is a minimum standard and it is inappropriate to include a huge level of detail with regards to smoke alarms. What is your response that?

**Ms Coate:** The National Construction Code is a fantastic document and is continually evolving and changing. It is my hope that it will continue to do so and grow with that. It is though a result of the committees that go behind it and the requirements of the states and federal government about what its scope is. From the fire protection industry, we develop standards that we believe to us would be the minimum but then we have people at the ABCB or Department of Treasury conducting regulatory impact statements and determining that the cost of implementing changes which we deem to be minimum are too expensive and therefore outside their ability to adopt within the National Construction Code. But the ABCB is a servant of the state and federal governments and if there was a policy change from the state federal governments in the intergovernmental agreement then that would be changed. But I can understand their reluctance to take all the advice the fire industry gives them because we want the very best fire protection. They say they are the minimum. They can only record the minimum. Anyone can install over and above the standard of the requirements of the code, but they can only put in the minimum requirement that the Australian community requires.

**CHAIR:** So would you support an amendment to lift that standard?

**Ms Coate:** Yes certainly.

**CHAIR:** The advances in fire safety, can you give this a bit of an idea how we are advancing in that area?

**Ms Coate:** In the domestic market, not all that much. The real change comes, as it probably does for all industry, in the commercial industrial environment in the first instance. But if there were more requirement in the built environment to be brought up to work new standard then change might happen more quickly.

I would also say that smoke alarms are not necessarily the only solution, that this committee might think about our home residential sprinklers. Working together they can save lives, they can save property and they can reduce the requirement for state governments and territory governments to have fire brigades stationed at close environments. If a new suburb is being built and every house in that suburb is sprinkler protected off the incoming water supply then perhaps instead of having a station every 20 kilometres, they might be able to have it every 30 kilometres because the risk is being dealt with immediately by active system. So in conjunction with a smoke alarm, people are alerted, the fire is being attacked while the fire brigade is getting to the incident.

**CHAIR:** Do you have any members in the Northern Territory?

**Ms Coate:** I do, yes.

**CHAIR:** What is the talk coming out of there? I think they have made a law there that it is compulsory to have photoelectric smoke alarms.

**Ms Coate:** I am not getting any resistance to it. People are complying as they are working around the Territory and just installing.

**CHAIR:** Are there any stats out there that would suggest that the incidence of fires, deaths or injuries as a result of fire have gone down as a result?

**Ms Coate:** Not that I have access to. One of the difficulties of collecting information in relation to fires is that the Privacy Act gets in the way quite a bit. If there is a fire in the building, the fire brigade will investigate. They collect a lot of data and provide it to the government, but that data and information is not necessarily always made available to others. It often takes a long time to come through as well.

**CHAIR:** I assume your members would support an amendment, say, to the Building Code for compulsory photoelectric smoke alarms.

**Ms Coate:** Yes.

**Senator LUDWIG:** One of the areas, of course, that you have been talking about is how your industry would cope with the changes. You represent the contractors, the people who install and the people who have to deal with the regulatory framework from the various states and territories.

**Ms Coate:** Yes.

**Senator LUDWIG:** How do they cope at the border between the Tweed and Coolangatta or between Wollongong and the Victorian border?

**Ms Coate:** They have to be informed. They have to understand the rules and requirements of every state and territory. As they move into a state or into another state, they have to understand what the local requirements are. If you are talking about the sprinkler area, there are different requirements about licensing for installing sprinkler

systems, so if you move from one state or territory you have to go and make sure the licence under which you operated in one is accepted in another. So it is very complex. It tends to make people have offices in each state and territory and use the staff from each state and territory even across borders rather than having, say, New South Wales operating in both Queensland and Victoria with the same staff.

**Senator LUDWIG:** So there is an opportunity for red tape reduction in all of this as well and certainly less burden for industry, and of course you pass that on: if you do not require the same regulatory complexities, it is a lot simpler for your contractors to work through the regulations. It is a lot easier and simpler.

**Ms Coate:** Certainly.

**Senator LUDWIG:** I have asked this question. I am just looking at form over substance, really. We seem to be stuck, if I can use that word. There seems to be a clear path to where we should be, and nationally we seem to have achieved that for commercial buildings, but we are stuck in what we do with existing residential homes in various states and territories. Do you think there is a solution, or is it just one of those inevitable consequences of a change in societal values and how we deal with it into the future?

**Ms Coate:** It would depend on the political will to change. As I said, I have participated within the fire industry for the ozone depletion and the use of products, and that took products which were extremely effective off our industry.

**Senator LUDWIG:** I recall that. It was not easy.

**Ms Coate:** It was not easy, but we all worked our way through the issues and got there. This is a similar thing—the government's support and industry support coming together and putting together a program that informed and delivered at the same time. If the National Construction Code cannot get us there but there were an environmental movement or a life safety movement that allowed us to move the National Construction Code to the place we want it to be much faster because there is total support from industry and governments, the community would then come to the party. You could have, as I said, local governments saying, 'If you have approved life safety measures from fire in your building, we'll give you a five per cent cut off your rates.' Those sorts of measures could be encouraged.

**Senator LUDWIG:** We seem to have managed with ambulances in Queensland, where we then included it as part of your rates. Once upon a time, the funding for ambulance officers was insecure. So there are solutions out there for people to progress, but in your view—I am paraphrasing—we lack the community pressure and will to change.

**Ms Coate:** If I took that proposal and did it in one state, that is fine. What I think we need is a nationally consistent process. Even with rainwater tanks there were differences between states and territories about what they would and would not allow. It just makes—

**Senator LUDWIG:** It changed over time, too.

**Ms Coate:** It did, but that came from an environmental push from the community—they wanted it. So if we could raise with the community the need for life safety in buildings by coming together as an industry and a collective government and just work—even if it is as simple as putting recommendations about the installation of smoke alarms in bedrooms. The bedrooms of today are different to the bedrooms of 20 years ago. The children now have radios, CDs and computers, all of which could malfunction at any point and cause a fire. Twenty years ago they did not have that. They sat in a lounge room with mum and dad and watched the TV. So we need to think about the type of housing we have today. The materials used in housing are far more combustible and give off far more toxic smoke than they did 25 years ago.

**Senator LUDWIG:** You talked about a fire products register. Could you expand on that.

**Ms Coate:** There is one called an 'active fire system', in which products used by the industry are certified as being compliant with particular standards. Installers can then install those products with confidence that they will meet the standard. One of my concerns about banning ionisation, which I would not recommend, is that with banning any product we do not have the security at customs to make sure that they are not brought in and sold, anyway. There is no national regulatory framework that provides an audit of systems in fire safety buildings. In some states if you can get consumer affairs to look at something they may do it. In Victoria I would have to go to the plumbing authority, which is through the Victorian building authority, to get them to look at fire products. That also is a mismatch. The industry and CSIRO came together through SSL many years ago and developed the active fire scheme, which industry now uses.

**Senator LUDWIG:** That is a point that is quite germane. Even if you tried to ban them it would be a tall order to achieve the regulatory outcome of a ban on ionising smoke alarms. I am thinking of trying to collect them even in the house I live in. They are everywhere.

**Ms Coate:** We had a similar problem with halon gas. If you remember the small containers—they were in boats, yachts and caravans all over the place. The fire authorities came to the party on that. You could drop them off at your local fire authority and they would get rid of them. The local fire stations came together in that way, because people were comfortable with going to the fire stations.

**Senator LUDWIG:** They were the extinguishers?

**Ms Coate:** That is right. But you could do the same thing with smoke alarms—even if you were looking to put in a changeover program.

**Senator LUDWIG:** Recycling of mobile phones and ink cartridges. There is a whole range of opportunities. But in your view a simple ban would be problematic for enforcement?

**Ms Coate:** Yes.

**CHAIR:** We have spoken to witnesses in regard to sprinklers—in fact it was brought to our attention first at our hearing in Brisbane. Where does the attitude come from about sprinklers? Everyone seems to be really interested in getting sprinklers installed in houses.

**Ms Coate:** They are very effective. There are people who say that the economic benefit is not there to put them in. I am sure you will hear from the Housing Industry Association that it would add to the cost of housing, and housing is already expensive. My argument is that it is more expensive to build a house than to repaint some walls in a room. The average cost of putting in a home sprinkler system running off the potable water supply is about \$1,500. You do it when you are running in the plumbing. I come from a sector that has sprinkler pipe fitters as a trade. My people do the installation in commercial and industrial buildings and apartment blocks. If you are talking domestic housing it would be done by the plumber as he is putting in the kitchen and bathroom water. He would run a simple one-branch system throughout the house, and it is done.

**CHAIR:** I had an aunt who was as deaf as a post. Through some unfortunate circumstances she lost her sense of smell. Are there smoke alarms that would accommodate this type of person, particularly if they lived on their own, like she did?

**Ms Coate:** They would obviously be more expensive but you can get them. You can connect them so that they shake your pillow or you can have strobing lights and things like that. They are not recommended for everyone, so it would have to be a high-end user. But people can be accommodated with different technologies.

**CHAIR:** You have answered this question, but I just wanted to give you the opportunity to sum up as we are running out of time. What role do you think the Commonwealth government should take in regulation in the issues we have been speaking about?

**Ms Coate:** I am hoping an outcome would be a leadership role in which we can work together with you and the state governments to bring together that awareness package—whether in that package we talk about giving us your old ionisation unit and we will give you a photoelectric one. I am sure the major importers of those products would be interested in that sort of arrangement with you. So there is that sort of outcome, while at the same time working with the National Construction Code development to include some requirements about the existing stock of buildings, rather than the new stock—whether that can be done at the federal level or whether it has to be done in every state and territory. It is a matter of working through those issues and trying to find a solution. All of industry would love to be involved with the federal government in such as process.

**CHAIR:** Do you think there is enough hard evidence out there to suggest we need some change?

**Ms Coate:** There are still people being caught in fires. There are still smoke alarms that are not being activated, because people either have not cleaned them, or they have taken the battery out or they have just malfunctioned because it has been in place for 16 years and no-one has thought to check it. If you are looking for a solution to reduce those deaths, yes, but the difficulty is the cost of raising awareness and whether the people who undertake the economic mapping of the benefits of doing it can agree that it is worth it. I am always on the side of 'yes, it is worth it,' but sometimes other economic people say there is not enough benefit in that.

**CHAIR:** We are talking about lives at the end of the day.

**Ms Coate:** That is my view, but that is not necessary always so. The cost of implementing something is sometimes seen as too much for the community benefit as a whole.

**CHAIR:** Thank you for your evidence today. It has been very informative.

**ISAAC, Mr David Paul, Managing Director, Fire and Safety Technologies Pty Ltd**

[11:29]

*Evidence was taken via teleconference—*

**CHAIR:** Welcome. Thank you for talking with us today. The committee has received a submission from you, published as submission 27. Before I invite you to make an opening statement, do you wish to make any amendments or alterations to your submission?

**Mr Orr:** No, I do not wish to make any amendments or alterations, thank you.

**CHAIR:** Would you now like to make an opening statement before we go to questions?

**Mr Orr:** I would indeed. Thank you very much for inviting me to attend before the Senate committee, ladies and gentlemen. I regret that I was not able to attend in person as I am currently traveling interstate. The basic thrust of our submission is to implore the Senate committee to act in whatever capacity it has to ensure that national legislation is adopted in the BCA to require multiple interconnected smoke alarms in all habitable rooms and rooms connecting sleeping areas to living areas on every storey and in all homes and, most importantly, that it is a photoelectric type of smoke alarm or a photoelectric heat combination smoke alarm. Just doing that at a national level will, I think, only affect new stock.

The big problem we have, as I heard in the tail end of Carmel Coate's presentation, is that somehow we have to provide an incentive for existing homeowners to change their stock. From a fire and safety technology point of view, it defies common sense in fire engineering terms that we would require smoke detection in all habitable rooms and paths of travel to exits in commercial buildings where statistically the death rate from structural fires is in fact very low; yet in the residential applications where statistically the death rate from structural fires is unfortunately high, we only legislate to require as little as one smoke alarm or two smoke alarms in some cases in a two-storey home for the whole residence. And we do not even specify the type that is required.

Those who have read my submission will be aware that in 2008, we produced a draft standard—I am a member of the standards committee; and this is a product standard which the public know as Australian standard 3786—that would require all smoke alarms, regardless of the technology employed, to pass a visible smoke test. It is profoundly obvious, as one would think—that is, it is staggering—that the ionisation alarm that is installed in almost all Australian homes did not and was never required to pass a visible smoke test in the then current Australian standard testing conducted by previously the SSL and currently the CSIRO. So the essence of the problem is that no manufacturer or industry representative of a manufacturer wants to admit there is any performance problem with ionisation smoke alarms. In fact, in 2005 a QSES member stated on ABC radio that the reason Standards Australia changed the 1670 detection standard—that is, the commercial detection standard—in 2004 to require photoelectric smoke alarms in sleeping areas and paths of travel to exits was on the basis of the radioactive disposal issue. Of course, that is just not so at all. One of the major performance issues with ionisation detection is that it does not adequately detect visible smoke, particularly cold smoke. So, since visibility is a major tenability criteria—in other words, it is a major impediment for people to escape from buildings where they cannot see where they are going—the FP2 committee specified photoelectric smoke detection alarms in sleeping areas and paths of travel to exits for that very reason.

Moving on, I think some of the issues with smoke alarms and particularly ionisation smoke alarms that cause the greatest problem today is that they have a particularly high nuisance alarm rate, and that is the sole cause of disconnection. It is difficult to understand when statistically we know that these ionisation smoke alarms—more than 30 per cent of them—are disabled by consumers within two years of installation. Those are staggering numbers. If we know that there is a disconnection rate and we have seen and heard reports from fire brigades that there was no working smoke alarm in the home or that the batteries had been removed, we should be asking ourselves: why do we legislate a smoke alarm that the consumer out of necessity needs to pull the batteries out of to have a reasonable lifestyle? Herein lies the second issue with these ionisation smoke alarms. Perhaps further we should ask ourselves: why is it that in hotels and other accommodation buildings and shopping centres the Australian standard 1670 part 1, which is called up by the BCA, requires photoelectric smoke detectors to be installed in sleeping areas and paths of travel to exits?

The BCA also specifies that photoelectric detection must be installed in patient care areas in hospitals and formerly in buildings with atria. Yet we continue to sell ionisation alarms into private homes, where the death rate in Australia—and Australasia, for that matter, and in the US even worse, and in the rest of the world—is at a really high, unacceptable level. We continually fail to warn the public of the known limitations of ionisation smoke alarms. So why do we require a higher quality of detection in hotels and hospitals than we do in our homes?

There have been numerous lawsuits in the US where the ionisation smoke alarm has been labelled as the legal cause of death in many instances, and some of the most severe penalties have been applied to manufacturers. One such case was the recent New York case of *Hackert v BRK*. The manufacturers took the results of the trial to appeal, and the appeal judges ruled against the appeal and stated that the manufacturers were liable because they had failed in their duty of care to warn the consumer that their ionisation alarms may fail to warn in time for them to escape.

In fact, in Australia, if we bring this home and we go to the Australasian Fire and Emergency Service Authorities Council's policy statement on smoke alarms, we find that they have a clear statement in there that all residential accommodation should have photoelectric smoke detectors, and in fact they warn that, in cases, ionisation smoke alarms may not warn you in time to escape to safety. So AFAC have probably taken the most direct approach when they say:

- ionisation smoke alarms may not operate in time to alert occupants early enough to escape from smouldering fires.

Then we look at how the ABCB actually rejected the Standards Australia approach to have the smoke alarm standard changed. The Australian Standards Committee was very concerned about tenability aspects and very concerned about the ability of a device labelled a smoke alarm to respond to visible smoke so that, when a consumer is sleeping in his home at night and a smouldering fire may develop from either an electrical fault or perhaps a cigarette left on a couch or on a bed, the consumer would get the earliest possible warning. Yet in our commercial premises we specify photoelectric. So we adopted the same policy. The smoke alarms need to be the same, because when people are asleep they are in the most vulnerable position and are most likely to succumb to the toxic species of the smoke, so by the time we wake we may not have sufficient clarity of mind or even time to escape.

When we look at the data which is now readily accepted by Australian fire brigades, by AFAC and in fact by fire brigades universally—where they say that they estimate now that the safe exit time in a fire today is less than three minutes from the flaming stage—I have to ask the committee and any witnesses or people present at the hearing today this question: do you fully understand this? Do you understand that a fire that smoulders and develops for a significant period undetected will travel at approximately eight metres per second through the home if the fire reaches flashover? At this point, if the home is still occupied, the fire is likely unsurvivable. Even if the fire does not reach flashover, it is particularly dangerous when the occupants are asleep. The three minutes to untenability, which means unsurvivability, is all the occupants have once the fire reaches the flaming stage. An ionisation alarm will typically only detect the fire at the flaming stage, and that is only if the ionisation alarm is in the location of fire origin.

That brings us now to look at what is the test that the ionisation smoke alarm is required to pass in the Australian Standards test. What is the significance of the fact that an ionisation alarm does not have to pass a visible obscuration test? If we look at what the pass criteria are under the Australian Standard, the average photoelectric smoke alarm activates at between eight and 15 per cent obscuration per metre. To put that into some perspective for those listening to my submission, if you had a fire that started in a room—you could burn any type of material you wanted—and the smoke obscuration level reached about 12 per cent in the room, there would be enough irritation and discomfort in the room to have you wanting to leave the room as soon as possible. So at 12 per cent you really would not want to be in that room, and tests have been conducted in the US demonstrating that fact.

If we now take a look at the Australian Standard test for the ionisation smoke alarm, I would like to explain to the members present today how that smoke alarm is tested. Picture a room that measures approximately 7.6 by 12.2 metres, which is the smoke test room at the CSIRO laboratory. We have a ring of smoke alarms on the ceiling in a radius of three metres, and 2.7 metres directly below those smoke alarms is a 3.6-kilowatt element mounted with a 300-millimetre-square piece of masonite. Most people in the room, hopefully, are aware of what masonite is: it is a compressed cardboard used as a building material in years gone by and still used as a form of building material in cabinet-making. This piece of masonite is heated with the 3.6-kilowatt element underneath to produce a rate of smoke obscuration of five per cent per metre per minute. Five per cent per metre per minute is a very substantial amount of smoke generation—so much so that the test is virtually over within 17 minutes.

But I would like to paint a picture for those present. The ionisation smoke alarms and the photoelectric smoke alarms are tested to exactly the same fire. The pass criterion for photoelectrics is that they must go into alarm by a nominal obscuration of 15 per cent per metre, but that is not the criterion set for an ionisation smoke alarm. That criterion is set at 0.6 MIC X. That means nothing to the average person, but that is a sub-micron particle count. While these tests are being conducted, there is a light obscuration metre at the top of the test room which is measuring the optical density in the room. When the average ionisation smoke alarm activates in these Australian

Standards tests at the required MIC level, the obscuration in the room can be as high as between 48 and 60 per cent obscuration per metre. Whilst that is an alarming figure, what is more alarming is that the smoke level in the test room has dropped down to approximately the height of the test fire before the ionisation alarms activate. So, if you were to visually witness that smoke test, you would be horrified. I would like to point out that if this were an average bedroom in a home, where ceiling height is 2.4 metres, in essence, if we do a sort of crude comparison, the smoke will have dropped to floor level before the ionisation smoke alarm would have activated, were that smouldering fire in the bedroom and that ionisation smoke alarm in the bedroom—because we know that under current legislation that is not the case at all.

So these are alarming figures. If you were sound asleep in that room, it is likely that you would be overcome by the smoke. If you had the fortune of waking and in fact the fire were occurring elsewhere in the home, it is likely that your escape path might well be blocked completely. We have had a number of tragic examples of this, and some of you may be aware of the tragedy of the Golinski fire on Boxing Day in 2011. I have kept a reasonable relationship with the Golinski family. The Golinskis had two ionisation smoke alarms in their home. Tragically, when they woke on that fateful night, there was no smoke alarm operating, and tragically at that point in time the fire appears to have already reached flashover in their home, and the consequences, of course, were profoundly tragic.

What I would like to point out is that, when FP2 made the submission to the ABCB starting in 2006 and 2007, we produced a preliminary impact assessment document which was submitted to the ABCB, and it was submitted to the Senate inquiry as my exhibit A. It shows, in fact, those graphs of a typical smoke alarm activation, and it shows the horrendously high obscuration levels of the smoke alarms in that particular example that was given to us. If you look at the appendix to the PIA at the back, you will find a pen recorder chart graph, and you will find that the obscuration levels of the detectors in this particular example ranged from 53 per cent to 62 per cent obscuration per metre. I will equate that back to reality again. If you were running for the door at 12 per cent per metre, do you think it is possible you might not find the door at 40, to 50 to 60 per cent per metre?

Nevertheless, when we submitted our preliminary impact assessment to the ABCB, the ABCB made inquiries in the US to the author of the report, Richard Bukowski. Mr Bukowski, in his style, acknowledged that he basically used the statistical analysis report and method in saying that either type of smoke alarm provides adequate time to escape. But it is concerning what Mr Bukowski acknowledged in a deposition on Wednesday, 17 September 2014, in California, when he was asked specific questions about his advice to the Australian Building Code Board. He was asked if he had advised the ABCB that NIST had concluded otherwise and that later, NIST, in their statement for the record of the National Institute of Standards and Technology to the Boston City Council Committee on Public Safety, on 6 August 2007, had significantly changed their policy, or rather, you might say, had come a little cleaner with the policy. In their statement for the record they said:

Ionization detectors have been shown to sometimes fail to alarm even when visibility in the room of origin is significantly degraded by smoke. Most photoelectric detectors alarm substantially sooner in these situations. In the NIST experiments the photoelectric detectors sensed smoldering fires on average 30 minutes earlier than ionization detectors.

What is even more concerning about the NIST assumptions and the NIST statistical averages is that their statement in the summary to the Boston City Council was:

An important conclusion from the 2004 NIST study was that the available safe egress time provided by a smoke alarm would be sufficient, in many cases, only if households follow the requirements in NFPA's National Fire Alarm Code (NFPA 72) for new construction, which requires the installation of fire alarms at more locations in order to improve audibility in bedrooms where occupants sleep with the door closed, and to provide warning to the occupants of bedrooms with closed doors when the fire starts in that bedroom. NFPA 72 also requires two ways out of a sleeping room, one of which is generally a window. With the bedroom door closed there is more time in which to use the window exit should the primary exit be blocked.

We know that in Australia very few two-storey homes have an alternative path of exit from the second storey.

What is particularly concerning is that I believe the ABCB was misled by data. If you look at the abstract and the executive summary of the NIST report on which the ABCB based their objection, and then you consider the lack of information that was provided by Mr Bukowski to the ABCB, I am sure that, if the ABCB had the benefit of seeing the statement for the record published later by NIST to the Boston City Council, they may have looked a little further into the FP2's submission.

It is unfortunate that when we look at these multiple-page reports most people go straight to the executive summary or the abstract. Very few people delve into the data within the report. When you look at NIST's response that either ionisation type or photoelectric statistically on average provide adequate time to escape, I will use a crude analogy I often use when I am trying to describe the extremes of statistical analysis: that kind of thinking

and statistical averaging would be like a statistician standing with one foot in a bucket of ice water and one foot in a bucket of boiling water and saying that on the statistical average they are feeling fine, when we know that either one of the extremes of those circumstances can be fatal.

When the ABCB rejected our submission to change AS3786 to require a visibility test, regardless of the type of technology, we could not make any groundwork with the ABCB, primarily based on data they had received from Bukowski and data on the NIST report.

I would like to raise a further concern that I have from our Australian regulatory perspective. We are talking about smoke, what is smoke and what is visible smoke. Let us look at smoke from a definition point of view and from a public perception point of view. If we go to the *Oxford*, the *Macquarie* or Wikipedia and look at the common view of smoke, the definition is that it is visible. We can take the simple analogy of the American Indians. They made smoke signals. These were obviously visible. So, again, the public perception of smoke is that it is visible. I am sure that, if the American Indians had used invisible products of combustion for their smoke signals, the message would never have got through. Please pardon my light-hearted approach there. If we then go to the gentleman who invented the first nine-volt ionisation smoke alarm—the popular nine-volt ion detector—in the mid-sixties in the US, Mr Duane Pearsall, we know that through the sixties and the early seventies these were not advertised as smoke alarms; they were advertised as products of combustion detection. Duane Pearsall's daughter Maryann Pearsall was interviewed by some colleagues of mine in the US earlier this year. She said that she could never understand why they were called smoke alarms. She said, 'We never called them smoke detectors because they never, ever activated to visible smoke. We always called them fire detectors.' Mr Pearsall sold his company in 1976, and after that time manufacturers started calling them smoke alarms.

How could a manufacturer call a device that does not detect visible smoke a smoke alarm? So we have a little bit of an anomaly here, because if we go to the National Fire Protection Association of the US and look at their definition of 'smoke' under their technical terms, they say that smoke is both the visible and the invisible particles of combustion. Yet, the public perception of smoke is vastly different to that. So we have to ask ourselves: how was this changed to a definition beyond the public perception? Just in recent times, you might have seen in the news where Uncle Tobys was prosecuted under the consumer protection act in Australia because they claimed that their Uncle Tobys oats had a level of protein that was not true unless you added a third of a cup of milk to Uncle Tobys oats to get that protein level. They were prosecuted for false advertising, even though they had in fine print that you had to add the milk to get the protein level. The courts saw that the fine print was an excuse for evading the public. We then go to the Ribena case where two school girls raised the issue of Ribena claiming a certain content of vitamin C in their Ribena drink. Ribena were subsequently prosecuted under the consumer protection act because of false and misleading advertising.

So I put to the Senate committee the situation where the average person goes to a hardware store and purchases a smoke alarm. When they arrive home, they fit that smoke alarm to the ceiling of their home truly believing that when they and their children go to bed at night that that smoke alarm will activate and will wake them before their house fills with smoke. I have to say, sadly, and on the basis of even CSIRO testing, you would have to agree that a smoke detector that allows the smoke to go to the floor level in a room before it activates is hardly a smoke detector and hardly fits the purpose. As much as I could go on a lot longer, I would like to pull up my submission at this point and just ask if the chairman has any questions for me. Thank you very much.

**CHAIR:** Thank you, Mr Isaac. Senator Ludwig, you might have some questions for Mr Isaac.

**Senator LUDWIG:** I do. I appreciate the submission and your verbal expansion of that submission. It is very informative and it also helps to focus the committee's attention on the issue at hand. However, I want to go to effectively your conclusion. In that conclusion, you talk about the regulator having been provided with ample information and proof of the issues with ionising alarms by the Australian standards committee of expert fire practitioners; but, ultimately, we are nowhere further advanced. We still have ionising smoke alarms. We still have a regulatory regime that applies to new buildings. We still have a regulatory regime that leaves a lot of discretion to the states. Do you have a view about how we move that debate forward?

**Mr Isaac:** I had a fairly strong view, perhaps unfairly, at one point that the ABCB were being significantly obstructive. I have since read the deposition that this fellow Mr Richard Bukowski gave in California last year. I began to realise that this guy did not tell the ABCB the truth about the subsequent findings of NIST, and if all they did was reinforce the executive summary in the abstract of the 1455 NIST report on which the ABCB based their rejection of our submission, then perhaps the ABCB, with further information, might have reconsidered the position.

The problem that we have is that we attempted to change a product standard based on the fact that the product standard was called 'smoke alarm'. If we had had a product standard that said 'products of combustion alarm' and a

separate standard for 'smoke alarm' then the public would be made aware that there is a distinct difference between the two different types of smoke alarms. But the problem is that we have a standard called 'smoke alarm standard'. A smoke alarm product standard differs significantly from a commercial smoke detector standard, because a commercial smoke detector product is applied by expert practitioners generally, but a smoke alarm product is purchased by average consumer who goes down the road to a local hardware store and buys that smoke alarm. Because that is called a smoke alarm and because it bears the Australian standard mark, he believes that he is protected by the Australian standard mark and that he can install that smoke alarm. So I draw this distinction between a commercial product standard and what I call a consumer product standard.

The simplest way for the ABCB to resolve this issue would be to simply add the word 'photoelectric' in front of their national requirement for smoke alarms. Where they say it must be a mains powered, battery backed smoke alarm complying with AS 3786, they could simply say it must be a mains powered, battery backed photoelectric smoke alarm complying with AS 3786, and that would be a quantum leap forward in improving residential fire safety.

The other problem that we have is that currently, in most average homes, you will comply with the regulation by installing a single smoke alarm. It defies all logic to assume that a single smoke alarm in a home can detect a fire in time from developing anywhere in the home, in time for the occupants to wake and gather their children and safely escape. As you can see from all of the NIST summaries, the NIST reports that I had previously mentioned were based on the premise that the smoke alarm system was installed in accordance with NFPA 72, and that standard requires smoke alarms in every room, interconnected, and in every path of travel to an exit, interconnected. We in fact have an Australian standard, AS 1670.6, which has very similar requirements. But that smoke alarm standard has never been called up by the ABCB in legislation. So that standard does not have any legal standing, even though, as a standards policy, it reflects the FPAA's position, it reflects AFAC's position and, for most of us who have any degree of technical understanding, it reflects our understanding of the minimum public safety required. Sorry about the long answer, Senator.

**Senator LUDWIG:** Thank you. Do you think the Commonwealth government has a role to play in what is essentially your advocacy for change?

**Mr Isaac:** I have not had a good look at the Constitution and I am not sure the Commonwealth has too many powers over what have previously been state legislated issues. However, the states have given the National Construction Code, which is a quasi-federal code, power in terms of national construction. So I would like to think that the Commonwealth could significantly influence the direction of the ABCB or the direction of the code.

I am very aware of the philosophy of cost versus benefit, or the necessary application of the cost versus benefit. On the tail end of Carmel Coate's presentation she was also aware and personally difficult with that, as most of us do. So whether we like it or not there are actuarial values placed on human life, and, if the cost to implement a safer regime to save those lives exceeds the cost of the loss of those lives, it is very difficult to get that legislative change through government bodies today because everyone seems to hang on this cost versus benefit analysis; although I do notice that cost versus benefit was never applied to appendix J, or it never would have got across the board because of the huge cost of meeting greenhouse requirements. Nevertheless, that is a more political issue. The issue we are talking about here is the lives of mums and dads who should not need to understand the difference between the two technologies. They should be able to rely on buying a smoke alarm that carries an Australian standards mark. That should be their guarantee, if it says 'smoke alarm' and if it says 'bedroom' or it says 'for your home', they should be able to rely on that Australian standards mark and that that alarm is fit for purpose.

We do not use ionisation detectors commercially anymore. None of the modern manufacturers, none of the companies that currently manufacture commercial smoke detectors, have continued with ionisation in their new ranges of detectors. The company that invented ionisation detectors for gas detection way back in the 1930s, Cerberus in Europe, stopped manufacturing ionisation detectors probably 10 or 20 years ago. Yet we still persist in these cheap and what I call low-cost and poorly performing ionisation smoke alarms. We still allow them to pass the Australian standard and we still allow them to be installed in homes when we know that the public perception of smoke is different to the definition of smoke.

It is interesting that in the beginning of the Australian Standard 3786 there is a specific requirement that says that smoke alarms shall be designed to reliably respond to smoke. That is the opening statement. That standard, I might add, has now been superseded by a new standard which does not have that clause. But it is interesting to note that since 1993 we have had a requirement in the standard that says that a smoke alarm shall be designed to reliably respond to smoke. Obviously when a person reads that, the public perception of smoke is visible. Yet we know—and the evidence is in the CSIRO testing. I have seen other submissions for the Senate inquiry that say we

need to put more money into research, we need to do more research. I think this issue has been researched to death and I think we need to look at the pecuniary interests of manufacturers who funds some of this research and where its outcomes are going. We do not need to look any further than the CSIRO testing—our own testing, in our own backyard, which has been conducted on all smoke alarms in Australia since 1993. And the results are consistently similar. That fact has been stated by FP2 committee to the ABCB along with the charts and the documentary evidence back in 2006. But we failed to convince them, I am afraid, because Richard Bukowski of NIST failed to give the ABCB the correct updated information.

**Senator LUDWIG:** Thank you very much.

**CHAIR:** Mr Isaac, why do you believe the National Construction Code did not mandate the use of photoelectric alarms when it was first introduced, and why do you they have not updated that to suggest that photoelectric fire alarms should be used?

**Mr Isaac:** We submitted two preliminary impact assessments in an attempt to get this change through to the standard. With the first one they came back with a bunch of queries and with the second one we went back to them. They basically said that we had not provided them with sufficient evidence, even though the pen recorder chart shows the extremely high level of obscuration that the ionisation alarms activate at. Even though we produced all that evidence—you can see from my submission that I have attached that as an appendix, and there was a lot of other information that went with it—we get the impression that the ABCB rejected it, relying mostly on the abstract and summary of the NIST 1455 report and the subsequent reports from that. But at no point did Richard Bukowski, one of the co-authors of all of those reports, provide the information to the ABCB that was provided to the city of Boston. The city of Boston, following that inquiry, mandated photoelectric smoke alarms. So the city of Boston and most of the state of Massachusetts have mandated photoelectric smoke alarms. Interestingly enough, their death rate from home fires has dropped dramatically, particularly in the city of Boston.

We think that, largely, the ABCB rejected our submission on the fact that we did not provide enough information, and I struggle without. Also, they said that there could have been better efforts with COAG in terms of governments getting together and coming to a position on it and that public education was the key. Traditionally, we know that public education does not work. As I have said in this verbal submission to you just a minute ago, the public should not need to understand the difference; the public are not fire safety practitioners. Professionally, I am expected to make a decision on the type of technology that would be needed to meet particular design assumptions and a fire engineering solution, and I am qualified to do so. The public are not qualified and should not be expected to understand the difference, and should not at any time be expected to have any understand that they should have one smoke alarm over another. If the smoke alarm carries an Australian standard's mark and it is called a smoke alarm, it should be fit for purpose. An ionisation alarm labelled as a smoke alarm is not fit for purpose for detecting visible smoke.

**CHAIR:** Do you think the Australian Building Codes Board has been a little irresponsible in regard to not amending the code to suggest that we not use ionisation but that we use photoelectric smoke alarms?

**Mr Isaac:** My personal view on that is that they were much more than a little irresponsible. But I have somewhat moderated that view with the recent knowledge of what Richard Bukowski told them. It is a pity they did not bother to read the 200-page report. The data in that report is somewhat scary. Following the FP2 meeting, there was a meeting that we held with an ABCB member, where the ABCB advised what our responsibility was as a standards writing committee and that we were to give the ABCB technical advice, and they would act on that technical advice but that we were not to give any policy advice. In other words, we could give advice on the type of technology that should be used and how it should be applied, but we did not have any authority to say, 'You should use this technology here' or 'You must use this technology there.' They said that policy was there per them.

When one of the members of our committee, a very senior engineer of our committee and a highly respected member of the fire protection industry and, at the time, a senior Tyco employee, said, 'Can you explain to us why you ignored our technical advice on the amendments to AS 3786?' I will quote this response because it is a very concerning response. At the time, the gentleman from the ABCB stated in the meeting, 'The government has a particular view on this and the government will not be changing its view.' So when we have that message coming back from the ABCB, it was very difficult for us to understand what influence the ABCB were under. I might also add that we know that they were under some lobbying pressure from the manufacturers because the ABCB came back to us and said that that manufacturers are claiming they cannot supply enough photoelectric smoke alarms and, 'If you change the standards, we won't be able to meet the demand.' Then there were claims that they cost more so the cost versus the benefit analysis will not work out.

So we know the manufacturers will be the ABCB, but we were never privy to the arguments that the manufacturers were putting forward. But it is obviously in the manufacturers' interests to keep selling ionisation

smoke alarms because they are very, very inexpensive to manufacture. Most of them are manufactured in Malaysia or Mexico. The better quality ones appear to be manufactured in Ireland. But, in all cases, the ionisation smoke alarm can be manufactured for a mere pittance, so the margin on sales is noticeably higher on ionisation than it is on photoelectric.

We had the chief executive officer of BRK on an American *20/20* television network program say, some years ago, that the company makes more money selling ionisation smoke alarms than it does selling combinations or photoelectric. The old story, you can read into that what you will. I do not wish to be applying by innuendo but all of these matters and facts are on the public record and they can be obtained.

**CHAIR:** How should we go about, nationally, removing ionisation smoke alarms from the shelves?

**Mr Isaac:** The government could do a number of things. The government could provide an incentive program, like a buyback program. The consumer is the innocent party in all of this. Maybe the government could give a credit or maybe negotiate with local governments and offer rate rebates. There needs to be an incentive or methodology to make people get up and understand that they need to change these alarms.

As I said in my opening line, the essence of the problem around ionisation smoke alarms is that no manufacturer or industry representative of a manufacturer wants to admit there is a performance problem with ionisation alarms, because of liability issues. They want to keep selling them or they want to quietly roll into a photoelectric campaign and slide out of the ionisation campaign.

If the average person were to visualise the test at the CSIRO they would be horrified. I might add that an MLA, a member of the legislative assembly of New South Wales, wrote to one of the major manufacturers, on four occasions, asking them to tell what the level of obscurity was that my smoke alarm, that I have in my home—which is your smoke alarm, Mr Manufacturer—activated under the CSIRO testing. The details are on their test report. That major manufacturer in Australia refused to answer the question and has not answered that question, today. I know, factually, that multiple manufacturers have been written to, to ask the same question. No manufacturer wants to disclose that information, because they know the information is damning.

**CHAIR:** I have asked the previous witnesses this question: do you believe there is concrete evidence to suggest that photoelectric smoke alarms far outperform ionisation smoke alarms?

**Mr Isaac:** They absolutely do—in smouldering fires, by matters of minutes and hours. When you look at flaming fires, in residential premises, the performance difference between the two is 10, 20 and 30 seconds. What people keep doing is laboratory tests where they have a tray of heptane, on a concrete slab, and they test ionisation smoke alarms to that fire. Photoelectric will not respond to that type of fire. But the last time I checked in any Australian residence I could not find any heptane fuel stored in a clean container where it would burn cleanly. We all know that a fire, even if it occurred from a candle or in a waste paper basket, would be up against other furniture and involve other materials, within seconds. Those other materials would emit significant amounts of smoke.

There is another thing these people who keep doing these laboratory tests do not acknowledge, and we have known this in the industry for years. Take a commercial ionisation detector or an ionisation smoke alarm. They are only effective if they are installed in the room of fire origin. So I ask the question: where is the average ionisation smoke alarm installed in the average Australian residence? It is installed in the hallway, which is probably the most distant from any likely fire. The most likely fire is going to be in a living room or a laundry or a bedroom, some distance from the ionisation alarm. We know they perform poorly under those circumstances.

Under those circumstances, a photoelectric smoke alarm will perform way better. As the photoelectric smoke alarm distance increases from the fire, the particle size of the smoke increases and the photoelectric smoke alarm becomes much more sensitive to the smoke. The reverse occurs with an ionisation alarm. As the particle size increases, the performance of the ionisation alarm drops off, exponentially. So it is not rocket science. The evidence is out there. But, if we keep commissioning tests with what I would call engineered test fires, we will be able to play statistically with the results until the cows come home. It is not until we put somebody in front of the CSIRO test room and ask them to test smoke alarms to 2362.17 and watch the results—bearing in mind that when the smoke reaches the test fire it is already 2.7 metres below the ceiling. If the average person were to witness that test, they would be horrified.

**CHAIR:** We are running out of time, Mr Isaac, but I just want to get your thoughts and feelings on this. Throughout the day it has been mentioned that perhaps we could do more in the area of education.

**Mr Isaac:** I agree. You only have to look at the *60 Minutes* program that I attended last year. There was a massive run on photoelectric smoke alarms at the hardware stores following that program. But not everybody watches *60 Minutes*. I will keep reiterating: educating the public will not work unless we tell the public how bad

ionisation smoke alarms are. They are not going to go and change an ionisation smoke alarm to a photoelectric smoke alarm when the ionisation alarms always activates when they cook toast or open the oven. They think, 'Man, these things are supersensitive—this is surely going to activate in a real fire.' It is a complete deception in the performance of an ionisation smoke alarm. So I do not think you can educate the public to do this. What we need to do is create products that are fit for purpose, and only call a smoke alarm a smoke alarm when it can detect visible smoke.

**CHAIR:** Thank you, Mr Isaac. It has been very informative and I appreciate your time.

**Mr Isaac:** Thank you very much.

**HARDING, Mr Mike, National Manager, Building Codes and Standards, Housing Industry Association**

**WELLER, Mr Greg, National Director, Communications, Housing Industry Association**

[12:17]

**CHAIR:** Welcome. Thank you for coming here today and talking with us. The committee has received a submission from HIA, published as submission No. 22. Before I invite you to make an opening statement, do you wish to make any amendments or alterations to that submission?

**Mr Weller:** No, thank you.

**CHAIR:** Would either or both of you like to make an opening statement?

**Mr Weller:** I will make a short statement. The Housing Industry Association thanks the committee for the opportunity to appear at today's hearing. HIA members are responsible for the construction of over 85 per cent of Australia's residential dwellings and, as such, have a keen interest in the technical and regulatory matters concerned with home building. Smoke detectors provide an essential fire safety function in all buildings, including residential dwellings.

The National Construction Code contains provisions that, through state and territory building laws, regulate homebuilding in Australia. It sets out the requirements for the provision of smoke alarms in new residential buildings and for alterations and additions to existing buildings. Requirements in the code that smoke detectors are installed, are hard-wired and are interconnected are, in our view, highly appropriate. Importantly, the code also specifies the requirements for the positioning of smoke alarms in houses. However, it does not specify the type of alarm to be installed in a home in terms of the technology it employs beyond calling up the relevant Australian standard for smoke detectors.

State and territory legislation also regulates the extent, if any, of the installation of smoke alarms in existing homes. This, by way of example, may include the requirement for installation of smoke detectors in properties offered for rent or for sale. On this point, HIA considers that there are significant public health and safety gains to be made, along with economic benefits through a reduction in the destruction of property, through focusing on the installation and maintenance of smoke alarms in Australia's up to nine million existing properties. The extent to which these homes are not protected is unknown. It is not uncommon for reviews to be held in elements of the National Construction Code with the objective of continual improvement, and so we welcome this inquiry.

**CHAIR:** Mr Harding, do you have anything to add?

**Mr Harding:** No, I am all good.

**CHAIR:** In your submission you stated that the majority of your members choose to install ionised smoke alarms. Why is that?

**Mr Weller:** I would not agree that we said the majority choose to. We conducted a short survey which I would describe as a piece of evidence that is by no means definitive. We added the caveat in our submission that it was done in something of a short time frame that we may well could have done more extensively. It certainly indicated that there is variability in the decision to specify a type or not. Where there is a preference to specify ionisation, I cannot give a definitive answer as to why that is. It may well be that, due to advice, which could well be as part of manufacturers' recommendations, different technologies are being used for different parts of a home that is under construction. It may well be that those builders who filled in the survey were selecting devices based on the designs that they had and recommendations from manufacturers.

**Mr Harding:** To add to that, the National Construction Code tells you where to put your smoke detectors. If you look at two very reputable manufacturers in Australia that produce both, on their websites they say that you should use one in a hallway close to bedrooms and use the other one close to cooking areas. If you look at the way they are installed adjacent to bedrooms, it is generally away from cooking areas. So that could have an influence. I am not saying that it does, but I surmise that that is probably where that comes from.

**CHAIR:** The CSIRO stated in its submission that the use of smoke alarms imported into Australia which do not comply with Australian standards is a problem. Is that something that you are aware of?

**Mr Weller:** I guess it is a problem more broadly. It was not that long ago that we were in here talking to another committee about non-conforming building products. I do not have evidence as to the level that that occurs with respect to smoke detectors, but dealing with the issue of non-conforming products coming into the country is very high on our agenda. If the CSIRO have made that statement, based on a whole range of building products, we would have no reason to disagree with them. That would be a matter that goes beyond the technology that is being involved. As I say, it is a broader issue to do with non-conforming products.

**CHAIR:** What sort of role does the HIA play in ensuring that the Building Code is adhered to in regards to smoke alarms?

**Mr Weller:** HIA is a membership organisation. Membership is voluntary, so we provide services to our members that include training, advocacy on their behalf and provision of safety services for a range of products. We regularly provide advice to members on how to comply with the National Construction Code. We included with our submission, as you would have noted, an example of one of the information sheets that we provided to our members to assist them in complying with the code when installing smoke detectors. But as an organisation made up of members, whether the product be smoke detectors or other building products, we look for guidance through the National Construction Code underpinned by Australian standards in many cases for the acceptable technologies and solutions in building.

**Mr Harding:** There are a couple of other issues too. The first one is that when there is a change in regulation, be it a state or national one, we generally put out a member information sheet. In every state and territory you are required to have a licence to undertake work to a specific level, depending on your qualifications and your ability. The minimum requirement you have to have for any licence in any state is a cert IV course. In that cert IV course that we run in each state, which is run through our state offices, there is always a module on the Building Code. So things like smoke detectors, wind loadings, bracings and soil classifications are all included in there, and we have to amend that as the Building Code gets amended.

**CHAIR:** So the Building Code can be and has been amended at times as a result of technology and so forth. Why do you think that they have not budgeted too much on smoke alarms? Why do you think the attitude of the Australian Building Codes Board is that ionisation alarms are good enough to install in homes?

**Mr Weller:** I guess that is a question probably best put to the ABCB. We would certainly support reviews being undertaken from time to time, as we talked about—whether it is an event such as a cyclone or whether it is regular—into elements of the code so that we can continue a process of continual improvement. Likewise, that we have had a high-profile story around this issue and that we are here having this hearing today to us says it is an ideal opportunity to ask those questions and consider what is the best solution for the building of homes and, particularly, for the community.

**CHAIR:** Do you believe that parts of the Building Code could be amended in regard to smoke alarms?

**Mr Weller:** From our perspective, unlike other witnesses here today, we are not experts in the field of fire protection, so, from our point of view, it would be premature to make that decision. But it is something that, if there is a process in place and the decision does come down to one technology over the other, our members would comply with.

**CHAIR:** Have you ever spoken to the Australian Building Codes Board about photoelectric smoke alarms being a better product?

**Mr Harding:** Not so much about their being a better product. We have spoken to the ABCB following the *60 Minutes* program.

**CHAIR:** What did you speak about?

**Mr Harding:** We just said that, if there was going to be a review, we would offer our support in whatever way we could, resources-wise.

**Senator LUDWIG:** I have been listening to the evidence to date, and you are in an invidious position. If there were to be a mandated introduction of photoelectric alarms into residential houses, there would be an impost on your members, ultimately. They would then have to build that and factor that into the price of the home. Already you have got significant additions to the home. You have put in a whole range of things over the last 10 or 15 years which all add cost to the build, and your objective is, I think, to provide affordable housing to the community more broadly. But in terms of how you would go about it, because your members already have ionising smoke alarms and those who have them are fitting them out, would you require a regulatory change? Or is it a community expectation change that you would be looking for, if the committee were to recommend that photoelectric smoke alarms are far more preferable to ionising smoke alarms?

**Mr Harding:** I think there is no cost increase, because you are already required to have smoke alarms in houses. So there would not be a cost increase. The second thing is that, if the Building Code required us to put 10 smoke protectors in a house, one in every room, that is what we would do. If it required us to use a particular type, that is what we would do.

**Mr Weller:** It is true that it is a regular issue of ours that we do talk about cost, but I think on any cost differential between photoelectric and ionisation we would happily concede that cost, given the issue we are

talking about here. Again, given that the provision now is for smoke detectors to be hard-wired and also interconnected, the differences in the products themselves I suspect would be relatively negligible in the price of the home, if it is proven that that is what the ideal solution is.

**Senator LUDWIG:** Do any of your members already do that? I know you did a survey. I do not want to put you to any work. There is no mandated requirement for solar panels, solar hot water systems, inverter technology in the home or far more environmentally friendly homes. To a certain extent, it is a community expectation and there are HIA driven outcomes too. There are better houses. They are more efficient. There are a whole range of things. I think the industry has been responding to community expectations and community demands. Also, you have been leading the field. You should be congratulated for that too. So I am not being critical. There have been significant advancements in homes over the last 20 years. Do you not see photoelectric cell smoke alarms fitting into that? That is why I was wondering if some of your members had already adopted that approach and integrated them into various places and gone above the legislative requirements. I understand that if there is a legislative requirement you will always meet it. I have no doubt about that. I am not doubting that for one minute. But do your members go further?

**Mr Weller:** I suspect the builders who are closer to the product in general are looking for the solution that complies with the National Construction Code. For consumers, the level of understanding of the difference between the two technologies would be fairly low. Were we as an industry and a community to come to the conclusion that one technology was superior to another and that it required one to be mandated to the exclusion of another that would be something that would be achieved more likely through regulation than community demand.

**Senator LUDWIG:** I was asking more about whether you are aware of any of your members or builders offering the alternative product—that is, a photoelectric integrated smoke alarm—as an option? Already today if you buy a home off the plan there is the standard offering, the middling offering and the luxury offering. You can kit it out the way you like between those standards, and the prices obviously reflect that. Do you know if any of your members say, 'In the middle or premium offering we can also include photoelectric—

**Mr Harding:** If we were talking about kitchens and bathrooms we could say yes, but if we are talking about smoke detectors and wind bracing then the answer is probably no. We do not have evidence of that.

**CHAIR:** As there are no further questions, thank you very much for your time, guys.

**Proceedings suspended from 12:33 to 13:31**

**BURGESS, Mr Mark, Executive Manager, Commonwealth Scientific and Industrial Research Organisation Services, Commonwealth Scientific and Industrial Research Organisation**

**ZIPPER, Dr Marcus, Director, Commonwealth Scientific and Industrial Research Organisation Services, Commonwealth Scientific and Industrial Research Organisation**

**CHAIR:** Welcome. Thank you for coming here and talking with us today. The committee has received a submission from the CSIRO, published as submission No. 2. The Senate has resolved that an officer of the Commonwealth or of a state shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to superior officers or to a minister. This resolution prohibits only questions asking for opinions on matters of policy. It does not preclude questions asking for explanations of policies or factual questions about when and how policies were adopted. Officers of the CSIRO are also reminded that any claim that it would be contrary to the public interest to answer a question must be made by a minister and should be accompanied by a statement setting out the basis for the claim.

Before I invite you to make an opening statement, do you wish to make any amendments or alterations to your submission?

**Dr Zipper:** No.

**CHAIR:** I invite you now to make a brief opening statement before we go to questions.

**Dr Zipper:** Thank you for this opportunity to present evidence to this inquiry. The CSIRO provides the only Australian facility to test smoke alarms for the requirements of the Australian Standards. This service is provided to manufacturers on a commercial basis. Smoke alarm manufacturers with conforming product are invited to have details of their product included on CSIRO's active fire certification website. This provides a publicly accessible portal for homeowners and industry professionals to select tested and conforming products.

While the organisation notes the ongoing debate regarding detection technologies, our testing is provided in line with the requirements of AS 3786. This standard provides specific test requirements and performance criteria for both ionisation and photoelectric detector types. Our laboratory applies test parameters set by the Australian Standards and reports the results for each alarm, identifying whether they meet the defined pass/fail criteria. This test is not used to compare relative performance between alarms or alarm types, and Mr Burgess will discuss this aspect further as part of the opening statement.

**Mr Burgess:** Through the media, publications and other submissions to this inquiry, we are aware of references to CSIRO test results providing performance data on detection technologies. This data are primarily smoke sensitivity results, generated drawing testing of smoke alarms for CSIRO's commercial customers. From a scientific standpoint, it is both incorrect and misleading to use the results of this Australian Standards testing as a basis to compare detection technologies. The test fires referenced by AS 2362.17 and used in our laboratory were selected for its reproducibility in controlled laboratory conditions and not intended to be representative of Australian house fires.

We also need to highlight that the 2014 revision of AS 3786 has actually changed the test fires used in this testing. This is not to say that CSIRO's laboratory facilities cannot be of assistance in this current debate; CSIRO will be pleased to work with other agencies to develop experimental evidence that can assist in this decision making.

We would also like to highlight that detection technology is only one determinant in the level of safety smoke alarms deliver to the Australian population. Reading through other submissions to this inquiry from industry and fire service experts identifies detector placement, interconnection, sounders, maintenance and false alarm resistance as key factors in fire event outcomes. At this stage, CSIRO is unaware of any comprehensive analysis of these broader parameters relevant to modern Australian house designs and would encourage that research to be undertaken. We are also unaware of any formal analysis of past fire incidents to identify factors affecting smoke alarm operation, such as disconnected or disabled alarms and depleted batteries. To that end, we note the MFB analysis of the recent Lacrosse fire in Melbourne's Docklands identified smoke alarms being disabled by sealing them up with aluminium foil.

CSIRO supports the inquiry's aim and believes there is merit in debating the appropriateness of detector technologies. However, if we are asked the simple question of whether photo or ionisation detectors are better, we could not really venture an opinion based on current evidence. We believe the question should be debated as part of a discussion including the other parameters mentioned, with an aim to establish regulatory solution to the best protect the Australian public.

Finally, we would reiterate a concern raised in our submission regarding the nomination of smoke alarms with a mandatory Australian standard. Any benefit of increasing the stringency of Australian standards or regulatory requirements would be undermined if nonconforming products can be legally sold to Australian homeowners. To this end, we see some overlap between the work of this committee and the work of the committee inquiring into nonconforming products.

CSIRO thanks the committee for investigating this important issue and offers the support of our science capability and laboratory facilities in researching potential solutions. We would be pleased to take questions.

**CHAIR:** Thank you. Has the CSIRO conducted fire and smoke sensitivity tests on ionisation and photoelectric smoke alarms in accordance with AS 3786? If so, can you provide the committee with the results of these tests or surmise them for us today?

**Mr Burgess:** CSIRO has provided testing to AS 3786 for some 10 years. The testing is provided to commercial manufacturers of smoke detectors. Manufacturers who would like to sell their product in Australia and would like to sell it legally and with the appropriate certifications come to CSIRO and bring their product. We test it to the requirements of the Australian standard, which includes not only smoke sensitivity testing but a wide range of other tests, such as false alarm resistance, degradation, artificial ageing, battery life and sounder performance. So we operate all those tests through our laboratory and provide the results.

The question of simply releasing those test results becomes difficult. If the purpose of those results is used to simply compare photoelectric to ionisation technologies, the results of those tests would give a misleading picture of the performance of the two types of detector.

**Senator LUDWIG:** So why is that? I have been looking at your website. I understand your submission. I will paraphrase, and you can tell me if I am wrong. You test according to the Australian standard. Can you describe the test you might do for an ionising smoke alarm and a photoelectric alarm. I think there has been a bit of misinformation or misunderstanding about what those tests are for. You are not testing a real, live environment as to which is a better product or how the fire ignition works; you are testing to a standard?

**Mr Burgess:** Correct. I should highlight that we are talking about the old version of AS 3786. That was superseded in 2014. The test fire used in the old version of 3786 was chosen primarily for its reproducibility under laboratory conditions. If, for example, we tried to test detectors by simulating a cigarette pushed down the back of a couch, every time we tried to repeat that experiment we would get a very different fire growth and a very different situation, which would not provide a very useful measure for judging the suitability of detectors for use in Australia.

The test fire that was selected, historically—I think we are going back somewhere to the 1960s—was chosen as a reproducible test that uses a piece of masonite, which is a very uniform material. It uses masonite on a heater. It is a very reproducible test but is not very reflective of typical fires in a domestic setting—or a commercial setting, for that matter.

**Senator LUDWIG:** Your testing of that device to see if it works, if it is an ionising smoke alarm, it will detect the source of ignition and the alarm will go off, and it will have so much battery life or it is robust and it is repeatable. Is that, effectively, what you are doing?

**Mr Burgess:** Primarily. The test fire in the old version, 3786, the 1993 version, has two purposes. One is to set a baseline level of operation. It is the same test whether it is a photoelectric or an ionisation one, but the standard sets a level for photoelectric measured in obscuration for ionisation measured in MIC-X. So it sets a performance level.

The test has a second role. When we are going through our test program, each group of detectors—a group of 10 detectors—are tested before any subsequent testing is performed. We then apply a range of exposure on the other detectors. Some of this is accelerated environmental ageing, with high temperature and high humidity. Some detectors have a dust test. Some have a corrosion test to see how they handle corrosion conditions, over time. The smoke tests are repeated, at the end of all those exposures, to make sure that the detectors that have been tested do not degrade more than a defined level. So it is also testing the lifetime of the detector. That also indicates the need to have a very stable uniform smoke test that can be repeated before and after these other exposures.

**Senator LUDWIG:** The requirement is specified in 3786—pre-2014.

**Mr Burgess:** Yes, the requirements for each type of alarm.

**Senator LUDWIG:** For the sake of assistance to the committee, could you describe, in laymen's terms, what that is, what test you are trying to have the product meet?

**Mr Burgess:** The requirements laid down in the standard simply specify a range over which each detector type should operate. For the sake of precision, I will not quote exact numbers, if that is okay, without looking them up.

**Senator LUDWIG:** Yes.

**Mr Burgess:** It specifies a range over which each detector type should operate and then a range over which the average of all the detectors, in that sample of 10, should operate.

**Senator LUDWIG:** That is the density of smoke—they are my words. If you have a better description—

**Mr Burgess:** For photoelectric detectors it is specified as an obscuration per metre, smoke obscuration per metre.

**Senator LUDWIG:** Is that metre squared?

**Mr Burgess:** It is a linear metre, metre distance—how obscured it is.

**Senator LUDWIG:** Do we know what that percentage is? I will not hold you to it.

**Mr Burgess:** Off the top of my head, it is between three and 20 per cent.

**Senator LUDWIG:** It is what you can see, through the smoke, in a linear metre.

**Mr Burgess:** Yes.

**Senator LUDWIG:** That is for the photoelectric. For the ionising, is it a different test or the same test?

**Mr Burgess:** It is the same test, just with a different requirement. We compare photoelectrics to an optical measuring device. Ionisations are measured to a reference ionisation measuring device. So we have two sets of reference instrumentation.

**Senator LUDWIG:** They are measuring photoelectric, so you use a photoelectric measure.

**Mr Burgess:** A photoelectric ruler, yes.

**Senator LUDWIG:** And in the ionising, because they measure the drop in ionisation, there is an ionisation meter that you can use.

**Mr Burgess:** There is a reference ionisation detector.

**Senator LUDWIG:** That makes a lot more sense, now, to me—at least, so far.

**Mr Burgess:** It is an extremely complex issue.

If I can take two minutes to—

**Senator LUDWIG:** Please—so put it in context. You would have seen the submissions. The industry is promoting electrics—the fire brigades, the commissioners—as superior to ionising. They quote and bring you into it—CSIRO—and say, 'Here are the tests.' They do not reproduce the real world and they do not show the difference. They simply say: 'Here are the two standards that have to be met and they're different—photoelectric and ionising.' For a layperson, it can be a little confusing. Ultimately, the committee is trying to look at what is best fire detection for the community.

**Mr Burgess:** One thing I should highlight is CSIRO has never undertaken any research into the merits of detection type. We have not done a great deal of research into comparing these two types of technologies. Our involvement here is as a commercial test laboratory, applying a single test that is defined by others—in this case it is defined by the standards committee—so it is not as though we have developed a process for matching Australian house fire conditions. We are just following a very strict formula established by an Australian standard.

In doing so, though, we are aware that that particular type of test fire is non-representative. I should highlight the 2014 revision of 3786 has now adopted the international test fires. These, rather than using a single test fire as we do, a single piece of smouldering masonite, they actually require detectors to pass four separate fire tests. One of them is a smouldering wood fire—they do not use masonite, a peculiarly Australian product. One is a smouldering cotton, which produces a very cold but very white smoke. There is burning polyurethane, which is your typical couch or cushion, for example. And there is also a flaming heptane fire. So the new standard does not require detectors to meet one fire test; they have to actually meet and pass all four fire tests.

We hear—and reading the submissions to this inquiry—the talk of: 'Ions work better to flaming fire and photos work better to smouldering fires,' which is true. However, I should highlight there is a spectrum here. It is not as though there simply two types. The new standard by providing this test actually requires photoelectrics to perform to a flaming fire and ionisation to perform to a smouldering fire. I think it is a much better test regime; however, the new standard was published in 2014. It was adopted into the building code in May this year, and the building

code would be required for the manufacturing community, so manufacturers have two years to retest all their current stock.

**Senator LUDWIG:** So have you tested any recently that you can say, or are they commercial-in-confidence?

**Mr Burgess:** We have not tested any to the new standard as yet. We have a queue of people at that door—not said jokingly. I should also highlight—

**Senator LUDWIG:** So you can test the queues, because you have got the products; the test facilities.

**Mr Burgess:** They are just waiting their turn in the queue. I should highlight: to test a smoke alarm from start to finish, at last count, it is about 25 or 26 individual tests that have to be performed on those devices. The typical test cycle is around six months and, if there is any complexity, that can be a 12-month cycle. It is not a week turnaround on these tests; it is a major investment.

**Senator LUDWIG:** I was envisaging a couple of weeks—I fell a long way short.

**Mr Burgess:** Somewhat, yes. It is about a six-month process, because of the ageing—

**Senator LUDWIG:** The number of tests, the complexity.

**Mr Burgess:** The number of tests—and a lot of them are ageing tests—and battery depletion tests. It is a very slow process.

**Senator LUDWIG:** Have any products gone through the tests yet?

**Mr Burgess:** No.

**Senator LUDWIG:** So some are nearing the completion?

**Mr Burgess:** No, some are in initial stages.

**Senator LUDWIG:** So we will not know the results for six months or so?

**Mr Burgess:** No—and not only that but the reason I hesitated then is that, generally, if the detectors do not pass they will not be sold in Australia, or they will not be certified by CSIRO or certified on the ActivFire website. Most detectors that do not pass are never seen or heard from.

**Senator LUDWIG:** That information is commercial-in-confidence, as I understand it, because you do the testing of those products on behalf of the manufacturers on a commercial basis—is that right?

**Mr Burgess:** Correct.

**Senator LUDWIG:** So I could not ask you for a manufacturer's name and the result?

**Mr Burgess:** No. The ActivFire website lists all manufacturers who have successfully passed. We have to be quite specific in this: many of the Australian standards for laboratory testing are not developed as a comparative test; they are developed to ensure that a product meets a specific requirement—a specific technical or safety hurdle—and that is the extent of testing. We stop at that hurdle. For example, if we are doing a fire test on a building material and the fire test is a four-hour test, the test terminates at 241 minutes. It is four hours and one minute and the test is terminated because it is not designed to see which is the best wall; it is just designed to see which wall complies with the four-hour fire rating and then the test terminates. Much of the smoke detector and smoke alarm testing is very similar. It is purely a hurdle; it is not to establish an ultimate criterion.

**Senator LUDWIG:** So you are not choosing which product is the best or which type of offering by a manufacturer is more effective in a home setting; you are just meeting the standard that is set?

**Mr Burgess:** That is right.

**Senator LUDWIG:** I have described that in a very simplistic way. Thank you.

**CHAIR:** Has the CSIRO tested a new ionised smoke alarm and a new photoelectric smoke alarm with the same fire under the same circumstances?

**Mr Burgess:** All the testing is done with the same test fire.

**CHAIR:** Which one performed better in the same set of circumstances?

**Mr Burgess:** That is not a comparison we can make because we use a different measure for each one. It is the same test criterion, which is the smouldering masonite, but the photoelectric detector is measured against a reference obscuration or photoelectric meter and the ionisation detector is measured against a reference ionisation detector.

**CHAIR:** Is the masonite fire a smouldering fire? Is that what you are trying to replicate?

**Mr Burgess:** It is a very peculiar type of smouldering fire.

**CHAIR:** Which one operated better in that scenario? Which one went off first?

**Mr Burgess:** We do not run them in the same test.

**CHAIR:** Which one went off first? Just tell me which one did.

**Mr Burgess:** We do not do that comparison, Senator. We do not report the results on time; they are reported on the level of the measuring instruments at the point that the detector goes into alarm. The time is irrelevant in that test criterion. What is reported is the reference instruments' reading at the time of operation.

**CHAIR:** Do you have smoke alarms in your house?

**Mr Burgess:** I do.

**CHAIR:** What sort are they?

**Mr Burgess:** My house has ionisation alarms.

**CHAIR:** And you are quite happy to have those?

**Mr Burgess:** I should highlight several things: one, they were in the house when I purchased it; two, yes, I am happy to have those; but, three, I do have—and this is becoming about me, so this is not a CSIRO view—nine smoke alarms in my house and they are interconnected. I think that is very important. I have a two-storey house and I think interconnection between storeys is important.

**CHAIR:** I do too.

**Mr Burgess:** I should highlight again that CSIRO does not hold a view on the difference between ionisation and photoelectric. Our concern with the questioning over this testing is purely that it is not an appropriate measure for that comparison. We have spoken at length to the New South Wales fire service, whom we have done quite a bit of work with, recently, and we are aware they have a project running on smoke alarms, at the moment. We have offered our services, to the fire brigades, to develop test criteria that can allow these comparisons and can inform this decision, and CSIRO would be very eager to be part of that work.

**CHAIR:** We have only had two hearings, but all the witnesses whose role in life is to put fires out and go to the homes that have been burnt down are saying that photoelectric smoke alarms are far better than ionisation ones. Does that carry any clout with you?

**Mr Burgess:** Most definitely. There is also some scientific evidence, from overseas studies, to show benefits of both. What we raised in our submission and in my opening comments also needs to be reiterated: detection technology, amongst a lot of other factors, is quite important. One of the things I find, especially from the fire brigade submissions, is that they are concerned with disconnected or disabled alarms. The Australian standard for smoke alarms, at the moment, has very few tests for false alarm resistance. We are having a significant debate about detector-sensitivity performance—how quickly they go off—but we are not having a great debate about how quickly they go off when someone burns the toast. You can imagine someone who does that three times is very quickly taking the battery out of their smoke alarm at home. It is a very important debate, to look at the technology, but we need to look at the technology more than just on the grounds of its sensitivity and look at it in the total installed application, so we understand how the various merits of photoelectric and ionisation play out in the overall installation.

**CHAIR:** I agree with you. We are experiencing very high numbers of preventable deaths in house fires. I agree with you, totally. We should be having a debate not just dismissing something because, apparently, there is not enough evidence on it. Thank you very much for coming in and talking to us. We appreciate it.

**ASHE, Dr Brian Samuel William, Director, Australian Building Codes Board**

**LOVERIDGE, Mr Raymond William, Director, Australian Building Codes Board**

**McDONALD, Mr Matthew, Group Manager, Australian Building Codes Board**

**SAVERY, Mr Neil, General Manager, Australian Building Codes Board**

[13:58]

**CHAIR:** Welcome. We thank you for coming here today and talking with us. The committee has received a submission from the Building Codes Board, published as submission 21. The Senate has resolved that an officer of the Commonwealth or of a state shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to superior officers or to a minister. This resolution prohibits only questions asking for opinions on matters of policy. It does not preclude questions asking for explanations of policy or factual questions about when and how policies were adopted. Before I invite you to make an opening statement, do you want to make any amendments or alterations to the submission?

**Mr Savery:** No.

**CHAIR:** Would someone like to make a brief opening statement before we go to questions?

**Mr Savery:** Certainly. Thank you for the opportunity to present and respond to questions that you have. I firstly need to make an apology on behalf of the chairman of the Australian Building Codes Board, Prof. John Thwaites, who is unable to appear personally today, and to acknowledge that the submission made by the ABCB is on behalf of all its members representing the Commonwealth, state and territory governments, local government and industry as they relate to the area of building regulation, so it is a COAG body.

As outlined in its submission to the inquiry, the ABCB operates under an intergovernmental agreement, the mission of which is to address issues of safety and health, amenity and sustainability in the design, construction and performance of buildings. In doing so, the ABCB must have regard to a number of key objectives contained within the intergovernmental agreement: establish codes and standards that are the minimum necessary to achieve its mission; ensure that, in determining the area of regulation and the level of requirements, there is a rigorously tested rationale; provide regulations that are proportional to the issue so that the benefits to society are greater than the costs; ensure that there is no regulatory or non-regulatory alternative that would generate higher benefits; develop requirements that are performance based, verifiable and, as far as practical, consistent across the states and territories; ensure that the competitive effects of regulation have been considered; and encourage a reduced reliance on regulation. That is the charter of the ABCB, effectively.

The ABCB prepares model regulation that is adopted by the states and territories and implemented through their respective legislation. The Commonwealth does not legislate for building regulations so neither the ABCB or the Commonwealth actually regulate. What the ABCB does is develop model regulation for the states and territories to adopt. In turn, the ABCB reports directly to the Australian government state ministers responsible for building and plumbing regulatory matters through what is known as the Building Ministers' Forum.

In respect to the subject of this inquiry, it is important to note that the National Construction Code, which you will hear me refer to as the NCC, which is the document produced by the ABCB that contains the model minimum standards for building construction in Australia, that in turn the states and territories largely adopt because they can vary from the code, does not nominate and require particular types of smoke alarm technology as is the case with other building materials. The mandatory provisions of the NCC are contained in its performance requirements, which, in the case of smoke alarms, requires that occupants must be provided with automatic warning on the detection of smoke so that they may evacuate in the event of a fire to a place of safety. This requirement can either be satisfied through a performance solution, which could for instance involve a new technology, or a deemed-to satisfy solution, which, in the case of smoke alarms, is prescribed in the NCC as needing to be appropriately located, complying with Australian Standard 3786, connected to consumer mains power and interconnected where there is more than one alarm. It is then for the different technologies to demonstrate that they can comply with the Australian Standard, which, to date, both ionisation and photoelectric have been able to. So it is conceivable that another technology is out there waiting to be developed that could also meet those tests.

Importantly, the NCC does not apply retrospectively to existing buildings except in the circumstance where significant new building works are being undertaken. Therefore the requirement for smoke alarms to be fitted in existing buildings resides entirely within the jurisdiction of the individual states and territories. It is the ABCB's understanding that there is no nationally consistent approach to the application of smoke alarms to existing

buildings in Australia, where there is a greater exposure to risks of house fire and the greatest opportunity to increase the safety of building occupants, given that the NCC only affects two per cent of new building stock.

Since the introduction of contemporary standards for the design and construction of buildings through the NCC including houses, there has been a significant decline in the number of deaths and injuries resulting from fire. A number of assertions and claims have been made during the course of this inquiry about the conduct of the ABCB and the experts it has engaged or received advice from in the past on this subject. In addition to refuting these, the ABCB maintains that there has been no independent peer reviewed, robust and verifiable evidence provided to it that would support the calls to ban ionisation smoke alarms. Nevertheless, the ABCB has continued over the years to monitor developments with other countries that it engages with through the Inter-Jurisdictional Regulators Collaboration Committee, which includes countries such as Canada, America, Japan, Singapore which, other than for a small number of states in America, continue to have the same arrangements as in Australia as well as conduct investigations into the performance of smoke alarm technologies.

Where considered appropriate, the ABCB has made changes to the NCC including most recently the interconnection of smoke alarms following work undertaken by the Victoria University of Technology via the Australian Research Council which also supported the ongoing use of both ionisation and photoelectric alarms. The ABCB is currently collaborating with the Australasian Fire and Emergency Services Authorities Council, also known as AFAC, in carrying out comprehensive independent analysis of smoke detector technologies using an agreed methodology. The ABCB also considers the advice of its technical Building Codes Committee, which includes experts from a broad cross-section of industry and the state and territory building regulators. This committee has not seen fit to recommend the banning of ionisation smoke alarms. It needs to be pointed out that if the consequence of this or other work were to give rise to a technology being considered less than adequate, it would be necessary to review the Australian Standard threshold. When this last occurred, the relevant standards committee, FP-002, supported the revision of AS 3768 to be based on the latest comparable international standard, which was published this year.

Finally, as outlined in the ABCB's and other submissions to the inquiry, having a smoke alarm is one part of a number of critical steps that will determine the safety of individuals in the event of a house fire. Ensuring the appropriate location and maintenance of the smoke alarm, the number of smoke alarms, the occupant investigation and assessment time and the subsequent decisions of occupants are all critical factors.

I am happy to respond to your questions.

**CHAIR:** Why is it compulsory to put photoelectric smoke alarms in commercial buildings and not in households?

**Mr Savery:** I will make an official statement and then I will ask Mr Ray Loveridge to respond in more detail. The National Construction Code does not mandate photoelectric smoke alarms in commercial buildings—that is a statement of fact.

**Mr Loveridge:** We require photoelectric smoke alarms in sleeping areas in class 3 buildings, which are basically boarding houses, hostels and buildings such as those, because of the transient population and due to the fact that you will have people staying there that are unfamiliar with the building. They could be aged, people with disabilities or children. We also require photoelectrics in patient care areas of hospitals. The reason for that is ionisation can in certain circumstances activate falsely, and we do not want false alarms in patient care areas. You do not want to create a traumatic situation a hospital. We also have them for activation of smoke management systems.

**Mr Savery:** In response to your question, I think the reason why the question arises is potentially a confusion between performance requirements and Deemed-to-Satisfy Provisions. As I said in my opening statement, the mandatory requirements of the code are the performance requirements. There is no mandatory requirement for a particular type of smoke technology in a building. But the Deemed-to-Satisfy Provision that could be applied and used in many circumstances for a commercial building relates to a test standard that predominantly relates to photoelectric, so I think that is where the confusion sometimes arises.

**CHAIR:** We heard earlier today that we are now seeing dwellings housing numerous people and the fact that sometimes they rejig the shoddy walls and things to accommodate all these people. Should we not be suggesting or make it compulsory for those people to have photoelectric smoke alarms? The other thing I picked up on is the false alarms. We have heard that obviously one of the reasons why ionised smoke alarms do not work is that people get fed up with the false alarms. So why would we not be promoting photoelectric smoke alarms?

**Mr Savery:** I will take the second part first and then if others want to they can add to or elaborate on my comments. In the first instance, it comes back to this obligation on the Australian Building Codes Board to ensure

that anything it puts into the code, particularly in the form of mandatory requirements, is verifiable. Despite the fact that we have undertaken research, there is nothing that we have that provides sufficient evidence to the board—the board is 16 people, with states, territories, Commonwealth, local government and industry—that has satisfied it sufficiently that that particular claim can be substantiated in a way that it is leading to deaths and injuries when there is other evidence that indicates that the requirement to have automatic warning systems as part of the code has led to a significant decline in deaths and injuries. But having said that, as per my opening statement, we continue to monitor and, where appropriate, conduct our own assessment and research, which is why we have now engaged with AFAC to undertake new research—Mr Burgess from the CSIRO just made mention of that as well in his evidence—to see if there is some more truth that we can extract from these exercises.

**Senator LUDWIG:** It is a really interesting debate that you have opened up which you seem to be at the centre of. But the commissioners from the Victoria, the fire brigades and many of the advocates within the industry argue that, in a nutshell, photoelectrics are better than ionising smoke alarms. They say ionising smoke alarms do not detect smouldering fires with sufficient rapidity as photoelectrics—in other words, they are too slow—so the likelihood of there being a high level of toxic smoke inhaled and then having a fatal outcome is there. They also argue that ionising smoke alarms are subject to early trips, which means that human behaviour tends to remove the battery rather than have them tripped. Their experience of going to a building post a fire also highlights that, where six per cent of smoke alarms installed had been disabled in some way.

Summarising the evidence that witnesses have been arguing with the committee, they are firmly of the view that photoelectrics would be a superior product and ionising, for all those reasons, should be removed. The committee has heard all of that evidence. They then tend to point to you as being the holder of the key—in other words, unless and until the standards change, unless and until the recommendations from your board decides or comes to a different conclusion view that we will still have this.

The previous witnesses pointed to ionising smoke alarms as having a significant impact since they have been introduced. Also that they have halved the potential death by fire so they think it has been a great start. They just seem to suggest now that it is time to make that substantive shift. They also point to commercial buildings, which now have photoelectrics for all the reasons they have argued—they do not trip, they are responsive to smoke and them being interconnected also works. That is the sort of evidence we have been hearing. The challenge for us, now that we have you, is you cannot conclude on the evidence to date. I accept that if the evidence is not there. What evidence do you require? Are you part of that evidence-gathering body? I know that has been a very long question. In fairness to you, it is not an us-or-them process. We are actually just trying to get the best result for the consumers out there.

The witnesses also argued consumers are confused by which smoke alarm they should purchase. Having listened to the evidence, I have got ionising smoke alarms and I am probably going to very quickly get photoelectrics. Whether that is an informed choice, I am not sure yet.

**Mr Savery:** All of those representations have been conveyed to us. We have met with AFAC and with people who have made representations to you through submissions and verbally today. The short answer is, 'Yes, we are involved in that.' This new work that is being commissioned where we are collaborating with AFAC is precisely in response to those representations that have been made. It would be stupid of us to ignore representations being made by the collective of fire authorities around the country.

Having said that, one of the difficulties that exists is that the fire authorities have a different set of objectives in their legislation to the objectives of the ABCB. Probably one of the key differences—and I emphasised this in our submission—is that we set the minimum. When ionisation alarms and then photoelectric alarms appeared on the market, the minimum was—and it still is—that they both perform. Yes, they perform differently in different circumstances. The ABCB does not dispute that photoelectrics work better in smouldering and ionisation alarms work better in fire. That is not being disputed. But the ABCB has to be able to satisfy itself, if the standard is going to be reviewed. A review is not something the ABCB can actually do; it can initiate it, but the standard gets reviewed by Standards Australia and ABCB is involved in the process.

The other thing that I think is critical among the issues that have been raised is that the ABCB has such an elaborate framework for taking advice, collecting information et cetera. Whilst there are individuals and organisations in that huge collection of groups that have raised issues, there has not been anyone who has been able to gather enough evidence to persuade the entire body of decision making that ionisation alarms should be banned. I include in that not only the board itself, which as I have said before represents nine governments and their policy departments, but the Building Codes Committee, which has 25-plus technical experts on it, and the

Standards committee, which has different and sometimes similar experts on it. So it is not just one person or one group that has not yet been convinced.

But we continue to monitor and respond to the latest evidence that is provided. That is why only in the last two years the ABCB has been satisfied that the next minimum increment of change that should be included in the code is the interconnection of smoke alarms. That only came in two years ago. Prior to that, the last increment was that smoke alarms in new homes must be hard-wired. That did not exist when smoke alarms were first required to be put into the code. So you get increments of change when the evidence is clearly established.

I heard committee members say when questioning the last group of witnesses that your role is to look after consumer interests and to try to get to the truth. That is what the ABCB does every week of the year. It tries to establish the minimum set of requirements that should exist in buildings to ensure the protection of the health and safety of the public. That is its role.

**Senator LUDWIG:** You do not ban products; you set minimums. So the way an ionised smoke alarm would effectively be no longer able to be used would be if the minimum had conditions that an ionised smoke alarm could not meet.

**Mr Savery:** There are various ways. We think the appropriate way, ultimately, if it can be demonstrated, is to change the threshold test in the Australian standard. Of course, that does not mean that the ionisation industry, whoever they be, could not redesign their software or whatever to meet that new standard. That, to us, would be the most appropriate way. But, as the Northern Territory has demonstrated—through its fire legislation, not through its building legislation—you can mandate photoelectric technology, which effectively has the same effect.

**Senator LUDWIG:** Just remind me of something. The minimum is only that the alarm effectively—

**Mr Savery:** The minimum requirement, just quoting from the code, is that:

... occupants must be provided with automatic warning on the detection of smoke so they may evacuate in the event of fire to a safe place.

**Senator LUDWIG:** Yes. That is what I heard earlier. There is no time limit on that. So as long as the alarm sounds it meets that minimum test?

**Mr Savery:** Well—

**Senator LUDWIG:** It is worth exploring with all of these things—

**Mr Savery:** Sure. I am not a technical expert—

**Senator LUDWIG:** But this is where interpretation—

**Mr Savery:** This is the nexus between the code and the standard. The standard includes more than time. Ray?

**Mr Loveridge:** I have a couple of points, Senator, related to what you are saying. The Australian standard that we reference for housing is 3786. It was a 1993 standard. There was a revision that commenced in the mid-2000s. As part of that revision, it was proposed that the pass/fail criteria for the performance of ionisation alarms be amended. In effect, that would have prohibited ionisation detectors as they probably would not have passed.

We and several other people asked, 'Why this is necessary? Why are you changing? Show us the evidence that demonstrates that this is an appropriate outcome?' We did a literature review and we found quite a bit of evidence around the world from when real-life fires had been undertaken. The National Research Council Canada built a two-storey house with a basement. They set a number of fires in it. There were different types of fires. They included ionisation detectors and smoke detectors throughout different locations in the building. The activation times were comparable or, on average, they reported that ionisation detectors activated 14 seconds faster than photoelectric alarms. There is other evidence. We noted three particular scientific reports in our submission that indicate similar results. The research indicates that there is a place in this world for both types of detectors.

When we asked for evidence to demonstrate why the change was being proposed there was nothing provided. So, in the end, the Standards committee decided that they would not proceed along that path and that they would adopt the International Organization for Standardization document and modify it to suit Australia. That is the document that we now reference in conjunction with the old 1993 document and the 2015 document in the current Building Code of Australia. We will do that for about 12 months as a transition period.

**Senator LUDWIG:** Do you recall what the suggested change was? I am happy for you to take it on notice if you want to.

**Mr Loveridge:** Yes, we will.

**Senator LUDWIG:** I am just curious. So Standards Australia were suggesting that as the new minimum?

**Mr Loveridge:** Certain members of the Standards committee were suggesting it. It came out as a proposal in a pre-publication draft. It was referred to our Building Codes Committee on three occasions, from memory. On three occasions, the Building Codes Committee said, 'No, we can't justify the change.' So we did not adopt the amendment to the 1993 document. But then the committee decided to proceed down the path of referencing the ISO standard. It allows both ionisation and photoelectric technology. That is an international standard and we now reference that.

**Senator LUDWIG:** And then when you say it has been amended for Australian circumstances, we are not doing a CASA thing, are we? The Civil Aviation Safety Authority created their own standards, which—

**Mr Loveridge:** No, I think it is its own preface.

**Senator LUDWIG:** they have now been trying to get rid of for the last 50 years.

**Mr Loveridge:** No, I think it was modified in terms of format, preface, introduction and 'What are we trying to do here?'

**Senator LUDWIG:** Formatting changes, to make it conform.

**Mr Loveridge:** Yes. The other thing I wanted to mention is that people—you asked about the minimum requirement in our building code. The minimum requirement relates to providing safe evacuation. Evacuation time comprises a number of individual components, the first of which is activation time: at what time does the alarm go off? Then there is a second period, which is to account for human nature. People say, 'What's that?' 'It's a smoke alarm.' They say, 'Is it for real?' 'I will wander around the house and see if I can see smoke or smell smoke.'

They need to perceive a real threat to their life before they will evacuate, and that is the decision-making time. Once they decide that they are going to evacuate, then they start to move. There is a movement phase to that evacuation time as well, so you have the three times. The most significant is the decision making. Whether there is a small difference in activation times of alarms does not really impact evacuation time, which is the total of the three.

**Senator LUDWIG:** Right. That makes sense.

**CHAIR:** Why do you think the Northern Territory went down the path they did with photoelectric smoke alarms?

**Mr Savery:** I cannot be specific. Bear in mind that the building laws in the Northern Territory call up the provisions of the National Construction Code and, if you like, there is a bit of a contradiction in that their fire legislation, then, has this other requirement. The actual mechanics of what has gone on within the Northern Territory government to arrive at that, I could only speculate on.

**CHAIR:** Speculate, then.

**Dr Ashe:** There seems to be a view from some of the evidence that photoelectric is, by far, a much better technology than ionisation.

**Senator LUDWIG:** That would be correct.

**Dr Ashe:** On balance.

**Senator LUDWIG:** More than on balance. The evidence that has been argued in front of the committee is that we should abandon ionising smoke alarms and only mandate photoelectric, and have them integrated as well. I would say that is less strong but still quite strong, that the integration would work.

**Dr Ashe:** All of the evidence that we have to hand, the peer review and scientific literature, does not make that clear distinction that photoelectric is far superior than ionisation. In some cases, photoelectric performs better, in terms of the type of fire. In other instances, ionisation performs better. In our view, the difference is not significant. Importantly, the majority of houses in Australia and also internationally use ionisation detectors. The fatality rate, in general, not just in Australia but also overseas, is falling. The reason I am raising this issue is that I think it is really important that we consider the view that we should stop using ionisation, because it has proved beneficial in the past, and we need to be careful that we do not bring in—say, we bring in photoelectric and replace ionisation. It may lead to unintended outcomes.

It is clear that the literature that we have seen, the scientific literature, does not make a massive distinction between the two technologies. But, as you have mentioned, the evidence that you have heard in this case is that ionisation is bad technology and does not perform well and that photoelectric is much better. From our perspective, that is not the evidence that we are seeing and, as has been mentioned, we are working with the fire services and doing additional testing to see if we can, actually, differentiate them and either show that one technology is much better than the other or that it is the same as the scientific literature that we have received. So

it may be seen as challenging the other evidence, but I think it is a very important component that ionisation has proved worthwhile, and we need to be careful about removing some technology from the market.

**Senator LUDWIG:** To be fair to the witnesses that have given evidence, they have recognised that ionising smoke alarms have made a significant change to outcomes for people in the community being able to survive fires. One of the unintended consequences could always be that, if you remove ionising smoke alarms, the uptake of photoelectrics is not as strong and you then end up with a gap in the marketplace because of the cost, because of the availability, because people are unsure of that technology. They wonder what happened to the good old ionising smoke alarm that they have put everywhere when they are suddenly told that it is bad, without an explanation as to why. In Europe, evidence is that within perhaps five years there could be very different outcome with ionising smoke alarms based on radioactive material. Of course, people can jump to different conclusions. You would not want ill-informed decision making by consumers. I take it that is the unintended type consequence you are referring to.

**Dr Ashe:** Yes, and also that ionisation may be doing a very good job with certain types of fires.

**CHAIR:** The issue for me is that we have heard from a lot of people who have been victims of house fires and we have heard from people whose job is to try to put fires out and save lives. They are quite adamant that photoelectric fire alarms are far better than the ionisation ones. Do you consult with the fire brigade or people at the coalface of fires?

**Mr Savery:** Yes. For instance, AFAC, which is the collection of the 39-odd fire authorities around the country, is a member of our Building Codes Committee, as is the Fire Protection Association, both of whom have given you evidence today in written submissions. We engage directly with them. The three of us—Dr Brian Ashe, Matthew McDonald and I—met last week with the chief commissioner from New South Wales and with the chief executive of AFAC. It was not to talk specifically about this; there are other fire related matters. Fire safety, as you would appreciate, is probably the most significant part of the National Construction Code. So that is just by way of example of the extent to which we engage with the fire authorities. We work very collaboratively with them. There will be occasions, obviously, where we will have a difference of opinion, because, as I indicated earlier, the fire authorities have a different set of objectives to the ABCB. The fire authorities are not constrained by minimum performance requirements. For them, it is just, 'Why can't we do that?'

**CHAIR:** I just want to go back to the NT. You do not know what made them change their minds—

**Mr Savery:** I do not know specifically why they changed it.

**Mr McDonald:** AFAC's policy across Australia is photoelectric. I think the Northern Territory is the only jurisdiction where they have the ability to insert the requirement straight into their legislation. They are not subject to the same processes that the Australian Building Codes Board are in terms of impact analysis and consultation more broadly. So, for them, it was a much easier process to include in legislation than we would have to go through.

**CHAIR:** So they do not have to change, but they obviously saw something or were given evidence that changed their mind. Do you know what that is?

**Mr Savery:** I think that goes to the point that both senators are making—that, having the experience of fighting fires and going into houses, they have witnessed what they believe is a less effective technology over another. And they may be right. The ABCB does not necessarily contest—maybe someone could prove it, but the proof is not there, and the ABCB needs the proof. That is why, despite the fact that we have done years of analysis and research, that we have spoken to our colleagues internationally and that we have invited anyone else to give us evidence that could satisfy us, we are going to do another piece of research. We are putting some fairly significant funding into the project that AFAC is undertaking. We have arrived at an agreed methodology. We do not want to get to the end of that process and have anyone sit back and say, 'I dispute the way you conducted your tests.' So when we get those results, we can all rely on them and move forward.

I have to remind the committee that the ABCB also has to consider the competitive effects of regulation. When people talk about banning a technology or mandating a technology it is going to have a competitive effect. Whilst the ABCB is not in the business of banning of technology—as we said earlier, we think there is a more sophisticated way in which you would achieve that outcome—there is the real potential for repercussions if you have done something and you cannot demonstrate you have the evidence to prove that.

**CHAIR:** I do not think we are asking you, tomorrow, to decide—

**Mr Savery:** I know you are not.

**Senator LUDWIG:** It is a very good point you raised. I understood that. There are always consequences if you make a change. If you were to simply try to ban a product—I am never an advocate of banning products unless there is clear scientific evidence that demonstrates they are no longer safe to use. You will be subject to litigation, very quickly, if you do not have that evidence.

**Mr Savery:** Yes.

**CHAIR:** One of the issues is that we are happy to make it compulsory for photoelectric fire alarms to be in places like aged-care facilities and so on but we seem to be neglecting the household, where our loved ones are. From the evidence, people at the coalface of fire safety and dealing with fire are adamant that photoelectric fire alarms are better than ionisation ones.

**Mr Savery:** I will ask Mr McDonald to add to that. I would just make the observation that for exactly the reasons you are presenting we are sufficiently persuaded that we should do yet another piece of research. We could sit back and say, 'We have 10 years of evidence. No-one has presented anything new. We are happy with what we have.' But we are saying: no, we are not. The fire authorities keep saying this. They are convinced, but they do not have the data. If they had the data they would present it to us. So let's go and do another piece of work.

**Mr McDonald:** I was thinking about this question as a result of other submissions and some of the hearings you have listened to today. Another issue we need to consider is the number of fires that are flaming and the number of fires that are smouldering. We do not have that evidence either. We do not actually know. We understand that photoelectric perform better with a smouldering fire. If you think about a hotel situation or a hospital or other type of care facility, the type of fire that might initiate in that type of environment probably would be a smouldering fire. But in your own home, we know from other evidence, the majority of fires start in kitchens. They are not, necessarily, going to be a smouldering fire.

So without having records of why certain changes took place 20 years ago, that would be my assumption: we do not know the number of fires that are smouldering and the number of fires that are flaming. That also comes into play. As a technical person, I understand that would be a reasonable assumption to make about why photoelectrics would be more suitable to that type of environment, where you do not have cooking et cetera going on.

**CHAIR:** One of the good points that came out that today was that someone mentioned our lifestyle is completely different. We used to live in the lounge room and huddle around a TV. Now our kids are in their bedrooms playing around with iPads, iPhones and computers. Do you think you will take that into consideration when making a decision based on the evidence you find in this survey?

**Mr Savery:** The short answer is: yes. But it will not necessarily be part—is it part of the methodology, Brian, as far as you recall?

**Dr Ashe:** The testing we are doing with the fire authorities uses modern furnishings in the facility. So it will take into consideration that side of it—yes.

**Mr Savery:** I was also just going to add, you talk about being in a dilemma—the dilemma of the board. We also have evidence that says that smouldering fires are decreasing because, just as you have said about new technology and new furnishings, we also know that fewer people are smoking in bed. Smoking in bed was one of the main causes of house fires in the past. They were smouldering fires, not flaming fires. So societal change has huge impacts on the way that you try to deal with these issues.

**Dr Ashe:** At a general level as well, the fatality rate in fires has been falling. On an international level, the fatality rate in Australia is low compared to comparable countries. If we are looking to address the fatalities and injuries that still do occur, it is a social problem where the fires are. Just like any other injuries or risks, it is really a social issue. If you look at the fatalities in dwellings, probably 50 per cent of the fatalities are related to self-harm or substance abuse. So, in those cases, irrespective of what technology we use, we may not be able to impact that major component of the injuries and fatalities. I think it is how we look at the problem, whether we are looking at individual technology—which, as my colleague has mentioned, is only one part of it—or we are really trying to focus on the real issues.

**Mr Loveridge:** Just to run on Brian's point, we undertook independent research. We commissioned it with Victoria University as an ARC joint venture. It looked at the loudness and the location of smoke alarms in class 1 buildings.

**Mr Savery:** Sorry, just to interrupt, for the senators' benefit, class 1 and class 3—

**Mr Loveridge:** Sorry, housing. We looked at the loudness and the location. Location is very important. I have three ionisation detectors in my house, and one of them goes off every now and then because I have it in the wrong spot. They are not inclined to go off at random unless they are activated by something. That can be steam or very small particle smoke that comes out of your toaster. You will not even see it; you might smell it but you will not see it. So location is very important with ionisation as well. But in this research, there was about 160-odd deaths that had occurred in Victoria. It was an examination of coronial reports. In the conclusions to that report, the authors concluded that if you had smoke alarms, whether they be ionisation or photoelectric, in every room of a house and you interconnected all of those smoke alarms in every room of the house, you would still only save a maximum of 50 per cent of the population of fatalities.

**CHAIR:** That is if they are working properly, too, I guess.

**Mr Loveridge:** Yes.

**CHAIR:** Thank you very much, guys, for coming along. That concludes today's proceedings. The committee has agreed that answers to questions taken on notice at today's hearing should be returned by 18 December this year. I thank all of the witnesses who have given evidence to the committee today. I would like to Hansard, broadcasting and the secretariat. I declare the hearing adjourned.

**Committee adjourned at 14:44**