

Failures Research Project 2016

Stakeholder submission template

As part of the VBA 2016/2017 Research Program, the VBA's research team is undertaking a study of current and potential failures within the Victorian 'built environment', including building and plumbing work.

For the purposes of this research, we are defining a failure as any act or event arising from non-compliance with regulation, codes or standards, or as a result of other factors that are not subject to existing building and plumbing regulatory control, which may have health, safety or economic implications. ***This may include the failure of a particular structure or the performance of a building product in an unexpected or unintended manner, and broader failures of the regulatory system to effectively control current or future harms in the built environment.***

Stage 1 of this research project aims to identify and prioritise failures, based on available data and consultation with stakeholders. The results of Stage 1 will help the VBA to define key problems that should be better understood and addressed. Stage 2 will focus on understanding the nature and extent of key failures identified in Stage 1 to explore and develop appropriate targeted solutions.

As a stakeholder with insights into key failures and issues within the built environment, we welcome your views and contribution to this important project. As part of Stage 1, please consider and respond to the following questions, keeping in mind the need for supporting evidence. There are two sections we would like you to complete. Section A relates to **current** failures and issues, and Section B to **potential** or **future** failures and issues. We would like you to briefly outline:

- The failure or issue
- The importance of the issue to your organisation and any known impacts
- The stages in the building process where the issue occurs and why you think the issue is occurring
- The evidence you have to support your view.

To assist you with this process, the VBA research team is willing to answer your questions via email or over the telephone before you make your submission. Email Research@vba.vic.gov.au or phone 9618 9142.

Please complete the following template and submit it electronically (no hand-written submissions please) with other relevant documents to: Research@vba.vic.gov.au

All stakeholder contributions are due by Monday 26th September 2016.

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Please provide details of the person making the submission.

Organisation	Name of organisation:	Australian Institute of Refrigeration Air Conditioning and Heating
	Practitioners, members or people represented:	AIRAH members participate in all aspects of the building/property sector with a particular emphasis on technical service providers such as designers and contractors in the Heating, Ventilation, Air Conditioning and Refrigeration fields but also encompassing broader building services and building physics as well as ongoing management of systems and buildings.
	Name of the individual completing this form:	Phil Wilkinson
	Position within the organisation:	Executive Manager – Government Relations and Technical Services
	Phone:	03 8623 3010
	Email:	phil@airah.org.au
Or individual	Name:	
	Practitioner registration type or occupation:	
	Phone:	
	Email:	

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Introduction to AIRAH Comments

AIRAH receive constant informal comment from our members and other industry stakeholders regarding compliance issues in the HVAC&R industry. Feedback received from AIRAH state divisions is that there is a high level of 'undiscovered' non-compliance issues within several sectors of the industry.

AIRAH has previously asked Victorian division members and selected industry stakeholders to share their views and thoughts on compliance issues within the HVAC&R industry across all sectors. This failures report briefly summarises the feedback received to date.

AIRAH members work in many facets of the built environment.

There are several aspects to non-compliance including the type of issue, the sector in which it occurs, the nature of the issue, where it occurs in the supply chain and the frequency with which it is encountered.

Type of non-compliance

Non-compliance can result in significant health and safety issues including; inadequate ventilation, inappropriate microbial management, inoperable essential safety systems, as well as resulting in high-energy high-emission HVAC&R. Non-compliance can be *involuntary* or *voluntary*.

Involuntary or unconscious non-compliance - occurs through a lack of knowledge about the regulated requirements where the provider is unaware of the requirement and therefore makes no effort to achieve compliance. This issue also relates to skills maintenance in a changing industry and the complexity of the regulatory architecture that the industry operates within.

Voluntary or conscious non-compliance - occurs deliberately where the provider either makes no effort to achieve compliance or deliberately acts to not achieve compliance. This issue also relates to an equitable and competitive industry where proponents of non-compliance can undercut other service providers. Voluntary non-compliance can also occur when complying products are unavailable or impractical for an application, or when the regulation requirement is not 'believed' by the industry (e.g. it is too complex, it is incorrect, or it is out of date).

Compliance issues can arise at various points in the supply chain including:

- Product compliance - Product must comply with the requirements (flexible duct, electrical cable, fire rating systems, MEPS).
- Specification compliance - Products/Systems must be specified/designed correctly and appropriately.
- Installation compliance - products and systems must be installed correctly to achieve the required compliance.
- Operation and maintenance compliance - products and systems must be operated and maintained correctly to achieve the required compliance.

The role of self-certification

The reality is that in many sectors and at many levels compliance is dealt with by a self-certification system, where designers and contractors sign off on a system to certify that all works are installed and comply with the regulations and relevant standards. These certificates are then forwarded for higher level certification up the administration chain where the formal certifier may not actually see what has been installed. Final certification is often 100% reliant on the individual certificates supplied.

The reasons for non-compliance

The reasons for involuntary or unconscious non-compliance include:

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- Lack of knowledge of technical service provider and/or facility manager - Industry training
- Complexity in regulation - Regulations too complex to follow, requirement outdated or not believed.
- Value engineering or cost cutting changed original design intent, performance capability or build quality.

The reasons for conscious non-compliance include:

- To generate cost savings.
- To increase profit.

Drivers of non-compliance

Some of the drivers for non-compliance behaviours have been identified as:

- Cheaper install costs (Lower quality cheaper product delivers cost advantage).
- Reduced compliance costs (Lower documentation and management costs).
- Poor culture of not re-checking compliance due to changes made during a project.
- Pseudo self-certification leading to no real checking/validation activity.
- Lack of professionalism in the industry, poor education and understanding of the issues and legal implications.
- Lack of informed client/owner's representative.
- Historic installation and service practices not updated to meet contemporary requirements.
- Poor documentation of alternative solutions.
- Architects deskilling on facade and glazing performance.
- No project fee structure for energy consultancy.

Costs and impacts of non-compliance

Some of the impacts from the non-compliances identified include:

- Increased risk to life safety.
- Increased energy consumption and ongoing operating costs.
- Reduced operating/service life or increased maintenance costs.
- Increased environmental impacts.
- Reduced indoor air quality or comfort.

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- Discovery costs, to identify the issue.
- Rectification costs (when discovered).
- Legal and or arbitration costs (after rectification).

Potential/Suggested solutions

- State-based sessions on what is required — Building occupancy permits, prescribed maintenance, AS 1851, AS/NZS 3666.2.
- Mandatory certification included in regulations for all installations, including domestic.
- Introduce checks to balance self-certification conflicts.
- Certification requirements put in place for projects without building permits.
- For new buildings/NCC - Introduce mandatory building/system commissioning.
- Impose a requirement on building professionals to report on non-compliances (that they encounter) under their professional/licensing agreements.
- Develop a clear, tiered national engineer registration system that is recognised nationally and in all states and territories (states/territories should mutually recognise).
- Practice notes or compliance check lists published to cover the most common issues (nationally coordinated and shared).

Please find the material on current and future failures below, as advised by our Victorian members -

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A. In your experience, please tell us about building and plumbing failures **CURRENTLY** occurring within the Victorian built environment (starting with the most common or severe).

Issue No.	Brief description of failure or issue	Please rate how important is this issue to you or your organisation?	Why is it important? What impact does it have on your organisation, your members, the community etc.?	At what stages in the building process would you typically expect this issue to occur?	Why do you think this issue is occurring?	What evidence do you have to support your view? Broader, more varied and detailed evidence is better, so take as much room as you need. Please attach any relevant documents to the submission.
1.	Fire rating of service penetrations - often filled with inappropriate foams and sealants impacting FRL.	3-Moderately important	Undermines the fire safety in buildings, promotes spread of fire and smoke.	Installation Maintenance	Inappropriate application of products	AIRAH member survey
2.	Fire rating of power and control cabling - The power and control cabling of any equipment required to operate in a fire must be protected in accordance with AS 1668.1/NCC. Fans power and control cabling, including associated VSD (and equipment) are often not fire rated or suitable for use in a smoke control/fire mode application.	4-Very important	Ultimately this is an Achilles heel in any smoke control system. There is little point installing a system that is designed to fail.	Design Materials selection Installation	Lack of training/knowledge of the requirements.	AIRAH member survey
3.	Earthquake design standards - NCC requires AS/NZS 1668.1 systems to meet earthquake design standards but this is not widely understood or applied by	3-Moderately important	Essential service smoke control systems are designed/intended to be robust, but this is not being reflected in many installations.	Design Installation	Lack of training/knowledge of the requirements.	AIRAH member survey

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	industry.					
4.	Maintenance and maintainability of essential safety systems including poor fire damper checking, smoke exhaust system checking and stair pressurisation testing and checking.	4-Very important	Ongoing maintenance is a statutory requirement. Maintainability (access etc.) is an NCC requirement	Design Installation	Space tensions in buildings. Lack of co-ordination between parties. Lack of clear lines of responsibility	AIRAH member survey
5.	Section J requirements are rarely independently checked - Virtual self-certification system in place.	4-Very important	Section J is a complex set of requirements intended to address energy efficiency of a building. When these requirements are misunderstood or incorrectly applied the performance of the building will be under-expectation for its entire working life, until corrected.	Design Install	Lack of independent certification	AIRAH member survey
6.	Elements of a building or system are changed or deleted during the project construction and compliance with Section J (e.g. JV3 modelling) is never re-established or re-confirmed for the revised system.	4-Very important	The final building will not meet energy performance expectations and does not comply	Design Install	Lack of training/knowledge of the requirements. Requirement not clear. Responsibility for updating JV3 model not clear when changes to assumptions, design or installation are made.	AIRAH member survey
7.	Section J Architectural elements such as the building fabric insulation,	4-Very important	JV3 models and other design elements are based on the	Design Install	Poor certification systems	AIRAH member survey

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	glazing, material type, colour are incorrect/changed and not checked.		architectural details provided. When these are not checked/changed this will impact on the design and ability of the system.			
8.	Flexible ductwork does not meet the R value specified in Section J for the application/climate zone	3-Moderately important	Inferior and non-compliant product on the market with untruthful performance claims. Difficult for practitioners to identify	Non-compliant product will mean that the objectives of NCC/Section J will not be met.	Poor product compliance policing/verification	Insulation Australia report by Acronem consulting Australia P/l
9.	Flexible ductwork used between rigid ductwork sections (i.e. intermediate flexible/rigid/flexible).	3-Moderately important	This practice reduces the performance/efficiency of ducted air systems, and is not allowed under NCC.	Install	Convenience of the installation crew	AIRAH member survey
10.	Insulation on pipes, ducts, valves and fittings does not meet the R value specified in Section J for the application/climate zone.	3-Moderately important	This practice reduces the performance/efficiency of systems, and is not allowed under NCC.	Install	Poor product compliance policing/verification	AIRAH member survey
11.	No outdoor air provided to air conditioning in small scale jobs (Retail, residential, office).	4-Very important	Where small air conditioners are used, that do not have the capacity for outdoor air treatment, the air conditioned building is treated as "naturally ventilated". This has significant IAQ and health implications as windows are rarely left open when the A/C is on.	Design	These small split systems are cheaper to purchase and install and the NCC allows this practice although it does not meet the objectives of the code. (This is a loophole in the code). AIRAH recommends that any air conditioned space be mechanically ventilated.	AIRAH member survey

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12.	Kitchen exhaust hoods - not complying with AS 1668.1/AS 1668.2; low airflow, no overhang, no access for cleaning, no fall in duct, wrong metal thickness, not ducted to outside.	5-Extremely important	Non-compliant hoods and kitchen exhaust ventilation systems are a health risk and a fire risk	Design Install Operate	Lack of training/knowledge of the requirements. Requirements not clear. Responsibility for compliance not clear	AIRAH member survey
13.	Recirculating range hoods used in place of exhaust hoods (recirculating hoods are not an exhaust system).	3-Moderately important	Poor IAQ in these occupancies	Design Install	Easier construction Visual compliance but poor outcome	AIRAH member survey
14.	Carpark ventilation monitoring and control system does not comply with AS 1668.2 - CO sensors, set points etc.	5-Extremely important	Dangerous air contaminants can build up in these occupancies, CO can kill occupants	Design Install	Lack of training/knowledge of the requirements.	AIRAH member survey
15.	Discharge from carpark ventilation system exhaust does not comply with AS 1668.2; separation distances, discharges on boundary.	3-Moderately important	IAQ implications for public	Install	On-site compromise	AIRAH member survey
16.	Carpark ventilation systems do not achieve the minimum 1 ACH per 24 hour period as required by AS 1668.2/NCC.	3-Moderately important	Systems are simply turned off. Dangerous air contaminants can build up in these occupancies.	Design	Lack of training/knowledge of the requirements.	AIRAH member survey
17.	Electricians and holders of Certificate II RAC licences installing split systems including residential air conditioning and small commercial cool rooms etc., i.e. systems beyond the Cert II competency level.	4-Very important	Undermines the skills basis of the industry. Reduces the professionalism of the industry. Drastically reduces quality of installations	Design Install	Lack of training/ Completing work without knowledge of the requirements.	AIRAH member survey

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18.	Refrigeration suppliers not 'design registering' pressure vessels with state authorities such as AS 4343 Hazard level D shell and tube condensers as per WHS regulations.	3-Moderately important But not an issue for Victorian Jurisdiction operating under OH&S				AIRAH member survey
19.	Restrictions installing gas heating appliances and mechanical ventilation (via the Gas Code) are not well understood.	5-Extremely important	Poor interactions between flued gas appliances and mechanical exhaust ventilation systems have resulted in deaths. The rules regarding these need to be better communicated	Design Install	Lack of training/knowledge of the requirements.	Documented accidental deaths
20.	Insulating HHW valves is not industry practice but is a requirement of the NCC.	3-Moderately important	Industry practice not reflected in regulations	Design Install	Lack of training/knowledge of the requirements.	AIRAH member survey
21	Retrofits and refurbishment work is often not required to be in compliance with building regulations (no one asks or checks).	5-Extremely important	Uncontrolled refurbishment can undermine original design intent and lead to poor safety/health and energy outcomes.	Design	Poor knowledge of the requirements. Lack of enforcement	AIRAH member survey
22	Residential design/install Exhaust ducts discharging into sealed roof spaces. Air conditioning combined with natural ventilation. NatHERS and BASIX assessments poorly or incorrectly applied.	4-Very important	Ongoing problems with condensation/moisture, IAQ, and energy performance	Design	Cost cutting	AIRAH member survey

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B. In your experience, please tell us about **POTENTIAL** or **FUTURE** building and plumbing failures within the Victorian built environment (starting with the most common or severe).

Issue No.	Brief description of potential failure or issue	Please rate how important this issue is to you or your organisation?	Why is it important? What impact might it have on your organisation, your members, the community etc.?	At what stages in the building process do you think this might occur?	Why do you think this is a potential issue?	What evidence do you have to support your view? Broader, more varied and detailed evidence is better, so take as much room as you need. Please attach any relevant documents to the submission.
1.	No Essential Services Maintenance (ESM) applied - Operators deliberately ignoring permits, standards and prescribed maintenance requirements to save costs. Facility managers and service providers colluding in the above, consciously or unconsciously.	5-Extremely important	Can lead to very unsafe buildings. Demoralise the technical service providers. De-professionalises the industry	Maintenance post-occupancy	Lack of auditing/verification that maintenance is being procured/delivered	AIRAH member survey
2.	Poor ESM applied - Technical service providers unaware of the correct requirements and/or not completing the work in the belief that it is not important and it will not be checked resulting in; Work not done, No checking, tick box approach	5-Extremely important	Can lead to very unsafe buildings.	Maintenance post-occupancy	Lack of training/knowledge of the requirements.	AIRAH member survey
3.	Facility managers reacting to tenant thermal complaints without necessarily considering all compliance issues.	3-Moderately important	Correct control drives optimised performance	Maintenance post-occupancy	Lack of training/knowledge of the requirements.	AIRAH member survey
4.	Turnover in O&M staff and churn through tenancies	3-Moderately important	Poor 'chain-of-custody' for documentation on	Maintenance post-occupancy	No requirement to keep a 'Building Log Book" type	AIRAH member survey

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	resulting in poor O&M documentation and zero knowledge of design intent.		building /system		record	
5.	Refrigerant charge not in compliance with the requirements of AS/NZS 1677.2, particularly for VRV/VRF systems and residential air conditioning.	4-Very important	Can lead to very unsafe buildings. Including increased flammability risks with new refrigerants	Maintenance post-occupancy	New standard coming into play as AS/NZS 5149 parts 1 to 4. Opportunity to educate industry	AIRAH member survey
6.	Drop-in of flammable refrigerants to existing refrigeration and air conditioning systems and lack of awareness of the risks and appropriate measures.	5-Extremely important	Using flammable refrigerants in systems and applications not appropriate to their use can be extremely hazardous for service and maintenance personnel, workers and occupants.	Maintenance post-occupancy	Lack of training, Lack of licencing for A3 refrigerants Cheap and easy access to A3 type working fluids.	AIRAH member survey
7.	Refrigerant leakage, although illegal when avoidable, still appears to widely occur.	5-Extremely important	Environmental impact	Operation – post occupancy	Lack of awareness by owners/occupiers. Lack of enforcement	AIRAH member survey

End of AIRAH Submission