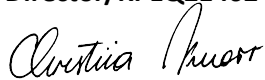


Technical Note

Project Name	Project No.	Document No.	Date	Prepared By
Visualert	2022-246	2022-246-TN01	11/01/2023	Christina Knorr Director/RPEQ21462 

1 INTRODUCTION

This technical note has been prepared for the Visualert Home Alert Systems being supplied by Assistive Tech Suppliers in Australia. CJK Fire & Safety Ltd have been engaged by Assistive Tech Suppliers Pty Ltd.

2 SCOPE OF THE PROJECT

The scope of this technical note is to assess the benefits of a hardwired interconnected smoke alarm system 'Visualert' and compare the reliability of a hardwired alarm system to a completely wireless system.

3 QUALIFICATIONS & RELEVANT EXPERIENCE

A copy of the author's Curriculum Vitae is in Appendix A of this report.

Christina Knorr is a Certifier – Fire Safety (Former C10), accredited by the NSW Building Professionals Board (BPB). Christina is also an accredited Fire Safety Engineer in Queensland and Victoria. She holds a First-Class Honour's Bachelor's Degree in Mechanical Engineering and a Master's Degree in Fire Safety Engineering with Distinction. She is a Chartered Engineer with Engineers Australia.

4 DISCUSSION

In the following sections, the reliability and benefits of a hardwired fire detection and alarm system are discussed.

When referring to a hardwired-interconnected system, it is implied the system is connected to a power source through wires. In addition, the various components of the system are interconnected via wires. The system is also provided with a rechargeable lithium battery back-up.

The reference to a wireless system means the power supply is provided via batteries and the interconnection between the system's devices is formed wirelessly via a Wi-Fi or radio frequency facility.

4.1 Power Source

A hardwired fire detection and alarm system is provided with two power sources. The primary source is the building power circuit (power transferred over the wire) and backup power provided by a battery. The lithium back-up battery is rechargeable with a life span of up to 10 years.

In contrast, a wireless system is powered by a battery that is not rechargeable and hence is subject to depletion over time.

The use of two stand-alone power sources for a hardwired detection and alarm system has been found to be more reliable compared to a battery-powered system. According to Ahrens (2021), hardwired smoke alarms operated in 94 % of the fires considered large enough to trigger a smoke alarm, whereas battery-powered alarms operated in 82 % of the time.

The various reasons for smoke alarms not operating in a home structure fire in the US from 2014-2018 are shown in Figure 1.

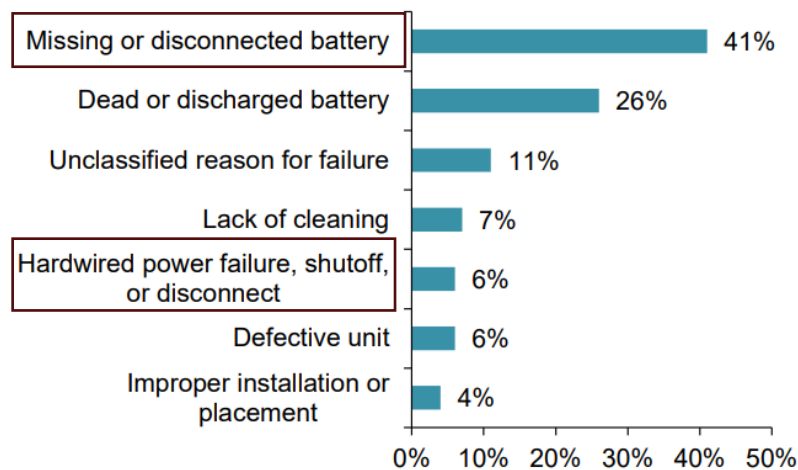


Figure 1 – Reason smoke alarms did not operate in a home structure fire in the US from 2014-2018 (Ahrens, 2021)

From the figure, it is visible that hardwired power failure is rare compared to battery failure. Hardwired power failure is 6 % compared to battery failure being as high as 41 % due to missing or disconnected battery.

The power sources are often disabled by the occupants due to unwanted alarms as the low-battery chirp is considered a nuisance. Whilst the hardwired alarm system is difficult to disconnect due to the wires running internally through walls or ceilings, a battery in a wireless system is easier to remove.

Being connected to a continuous power supply, hardwired systems will not stop sounding until they are turned off. In the event of a power interruption, these systems have battery backups for continuous operation. Therefore, failure of a hardwired system can only occur if both power sources become unavailable.

The batteries in an alarm system have a limited battery life and changing batteries does not require a qualified person. Therefore, lack of knowledge of battery life or human error can also lead to the wireless alarm not operating.

Due to the above-mentioned arguments, the power source for a hardwired system is more reliable compared to a wireless alarm system.

4.2 Method of Communication

The wireless alarm system uses Wi-Fi or radio frequency as the method of communication. If a wireless alarm system is using Wi-Fi as a means of communication and the router goes down, then communication can be interrupted.

Further, a wireless alarm system using radio frequency to communicate are susceptible to radio interference. In addition, a wireless alarm system has a limited range which may result in them failing to operate outside the range of the detectors. Experience has shown that the signal strength can depend on the type of construction. That is, in a building constructed of concrete the signal transmission can be weaker compared to a building that is erected using lightweight systems. Moreover, signal interruptions can be caused by factors such as obstructions, distance between devices, network interference, whereby several devices attempt to send signals at the same time and electronic devices such as wireless phones or microwaves.

On the other hand, hardwired fire detection and alarm systems communicate over a wire, meaning the signal would not be subject to interference factors mentioned above.

Due to the arguments presented above, communication over a hardwired fire detection and alarm system is considered more reliable compared to a wireless system.

5 SUMMARY

In conclusion, it has been demonstrated that a hardwired fire detection and alarm system, such as the Visualert Home Alert Systems supplied by Assistive Tech Suppliers, is comparatively more reliable than a wireless system.

As previously outlined, it can be concluded that a hardwired-interconnected fire detection and alarm system is more effective than a wireless alarm system. This is further supported by fire statistics as shown in Figure 2. Comparing the fatalities in home structure fires, 7.8 deaths per 1,000 fires occurred in homes with battery-powered alarms, while 3.7 deaths are reported in homes with hardwired alarms.

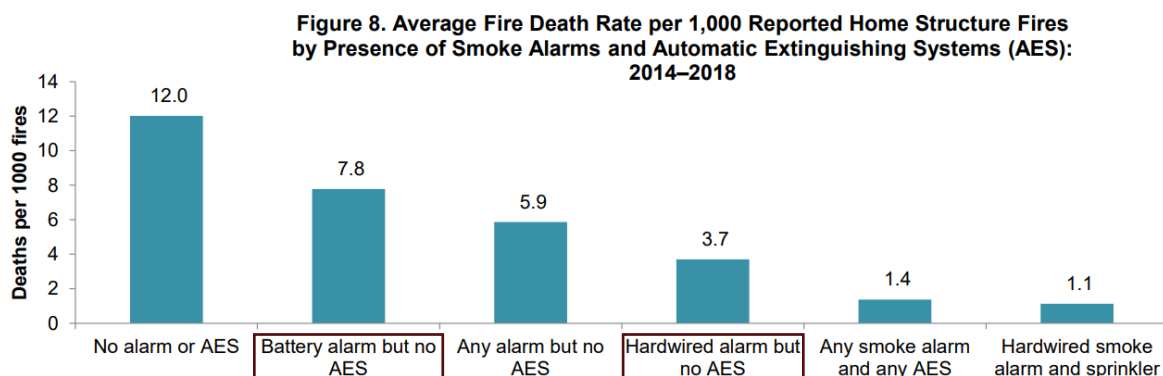


Figure 2 – Average Fire Death Rate per 1,000 Reported Home Structure Fires by Presence of Smoke Alarms and Automatic Extinguishing Systems (AES): 2014-2018 (Ahrens, 2018)

6 REFERENCES

Ahrens, M. (2021). NFPA's "Smoke Alarms in US Home Fires"

APPENDIX A - Christina Knorr CV



CHRISTINA KNORR

MANAGING DIRECTOR

Accredited Fire Safety Engineer experienced in Expert Witness work, training, and fire engineering assessments.



MISSION

To protect the lives of Australians by improving their fire safety awareness.

VISION

To ensure the highest standard of fire safety compliance, through expertise, education, and the development of customised solutions.

CONTACT

+61 433 598 884

c.knorr@cjkfireandsafety.com.au

<https://cjkfireandsafety.com.au/>

EXPERTISE

- Fire Safety Engineering
- Expert Witness
- Building / Fire Safety Audits
- BCA Compliance Assessments
- Product Development
- Presenting / Public Speaking / Lecturing

ACCREDITATIONS

- New South Wales, Australia, Accredited Certifier in Fire Safety Engineering (Certifier – Fire Safety, former C10)
- Victoria, Australia, Accredited Fire Safety Engineer
- Queensland, Australia, Accredited Fire Safety Engineer
- Chartered Engineer (MIEAust CPEng) Registered on the National Engineering Register (NER)

MEMBERSHIPS

- Engineers Australia
- National Engineering Register
- Women in Construction – FNQ
- External Advisory Committee WSU, Masters of Construction Law
- External Advisory Committee WSU, Masters of Fire Safety

QUALIFICATIONS

- Master in Fire Safety Engineering (Dist), Sydney
- Expert Witness Training, Sydney
- Bachelor of Mechanical Engineering (Hons 1st), Melbourne
- WHS – General Construction Induction, Sydney
- Interviewer for Engineers Australia National Engineering Register and Chartered Engineers applications

AWARDS AND OTHER

- Highly Commended, Consult Australia, Future Leader 2018
- Judge at the Australian Construction Awards 2018 and 2019
- Publication: Australian Construction Law Newsletter
- Competent Communicator with Toastmasters International
- CBWC Small Business Owner 2021 & 2022 Finalist
- HIA Building Women Awards 2021 & 2022 'Executive Management' Finalist
- HIA Building Women Awards 2022 'Professional Services Excellence' Winner 2022
- Cairns Chamber of Commerce 2022 Business Awards 'Community Contribution Excellence' and 'Customer Service Delivery of Professional Service Excellence' Finalist 2022

PUBLIC SPEAKING

- Professional Development Presentations 2018 - 2019
- 4th Modular Construction Conference 2019
- Sydney Build 2018 and 2019
- National Association of Women In Construction Seminar 2019
- InhouseGroup3 Breakfast Seminars 2018
- Norton Rose Fulbright Breakfast Seminar 2017
- Society of Fire Safety Seminar 2017
- DesignBuild 2017
- Annual Fire Safety & Cladding Summit 2019 & 2022
- UNSW Legal Intensive 2019 and 2021
- 2022 Engineers Australia Northern Regional Forum

WORK EXPERIENCE

CJK FIRE & SAFETY, CAIRNS, AUSTRALIA

2019 – present

Director / Accredited Fire Safety Engineer / Special Expert

STEPHEN GRUBITS & ASSOCIATES, SYDNEY, AUSTRALIA

2014 – 2019

Career progression from Fire Safety Engineer to Team Leader / Accredited Fire Safety Engineer / Special Expert

RESOURCE RISK MANAGEMENT, SYDNEY, AUSTRALIA

2012 – 2014

Project Engineer (Mechanical/ Fire Engineer)

NATIONAL CENTRE OF EXCELLENCE IN DESALINATION, ROCKINGHAM, AUSTRALIA

2011 – 2012

Mechanical Engineer in a Research Project

PORTFOLIO

EXPERT WITNESS, NSW, QLD

Variety of litigation and post-fire investigation matters. Completion of building inspections, expert reports, joint reports, Scott schedules and expert opinion.

FIRE ENGINEERING ASSESSMENTS – RESIDENTIAL, COMMERCIAL, HEALTHCARE AND MIXED-USE BUILDINGS, NSW, QLD, VIC

Completion of Fire Engineering Assessments against Performance Requirements of the BCA, including qualitative and quantitative assessments, supported by calculations, modelling and research. For various projects, the works included preparation and submission of a Fire Engineering Brief (FEB) and FEB Questionnaire.

FIRE SAFETY INSPECTIONS / BCA COMPLIANCE, NSW, QLD

Inspections of properties, preparation of site floor plans in AutoCAD using obtained measurements, design of a fire sprinkler system in accordance to BCA and the Australian Standards including hydraulic calculations using HYENA, reporting to the Client, liaising with the local Water supply authorities.

PRODUCT DEVELOPMENT SUPPORT TO A MAJOR SUPPLIER OF BUILDING MATERIALS, NSW, QLD, VIC

Performance of product assessments against the requirements of the BCA, support and assistance in obtaining product certification, preparation of reports to support CodeMark applications.

FIRE SAFETY ORDERS – RESIDENTIAL AND MIXED-USE BUILDINGS, NSW

Development of fire safety strategies for submission to Councils, negotiations with Councils and completion of performance-based assessments of fire safety issues identified.

COMBUSTIBLE CLADDING ASSESSMENTS, NSW AND QLD

Investigation into combustible cladding installed on building, arranging of product testing, preparation of reports and risk assessments. Provision of Expert Witness opinion on Combustible Cladding.

TRAINING SEMINARS ON COMPLIANCE AND OTHER FIRE SAFETY MATTERS, NSW, VIC

Development and delivery of customised presentations and seminars.

ESSENTIAL SERVICES AUDITING AND THERMOGRAPHY, NSW

Building inspections, report writing, preparation of Annual Fire Safety Statements, managing the project progress against the timeline, documentation submission to the client and the local Councils.



Mob: +61 4 33 598 884

Email: admin@cjksafety.com.au

Web: cjksafety.com.au