



Carpark fire safety – past, present and future

Adam Glew, Peter Johnson

ARUP

Preamble

Acknowledgements

Team members contributing to the literature review underpinning this presentation:

- Sigurjon Ingolfsson – Arup
 - Alistair Morrison – Arup
 - Julian Mendez – ex-Arup
 - Johnson Chua – Arup
- + Peter Johnson – Arup – for submitting an abstract.

Disclaimer

The literature review was commissioned by the Australian Building Codes Board (ABCB). All opinions expressed are those of the authors and do not necessarily represent the view of the ABCB.



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Bio



Adam Glew

Senior Engineer | Fire Safety

MEng (Hons) MIEAust AIFireE

- Lead fire safety engineer with c. 7 years of experience on a range of projects in London and Sydney.
- Core team member on 'CodeRed' – Arup's large-scale mass timber compartment fire experiments – focused on external flaming.
- Co-authored research for the Australian Building Codes Board (ABCB) on 'Fire safety in carparks' – which fed into proposed Building Code of Australia (BCA) 2025 updates.
- 1st Class Structural Engineering with Architecture (+ as many optional fire modules as possible) at The University of Edinburgh (2014-19).



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Contents

1. Big picture context
2. Overview of carpark fire safety research completed for the ABCB, focusing on:
 - a) Seminal carpark compartment fire experiments
 - b) Notable recent fire incidents
3. What happened next? Summary of changes in NCC 2025
4. Recent experience and challenges
5. Looking forward



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1. Big picture context



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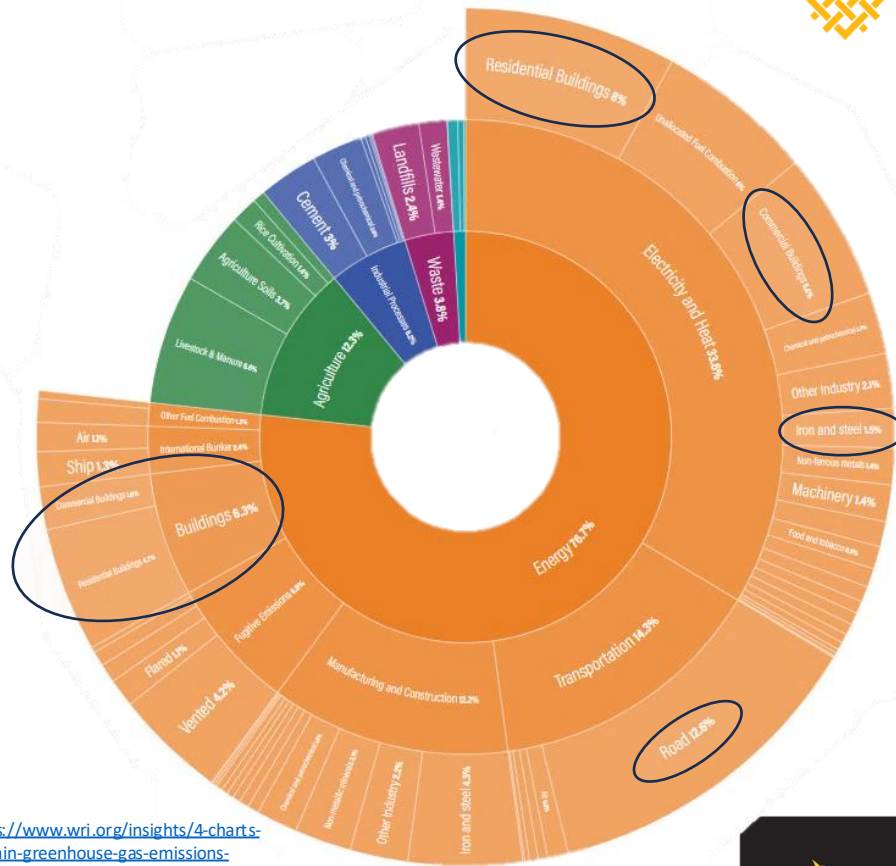


Why is this an important topic?

Global GHG emissions share

- Buildings (operational + embodied) $\approx$ ~20–21% of total global GHG
WRI, 2023 [right] and IPCC 6th Report, 2019
 - “Buildings are currently responsible for 39% of global energy related carbon emissions: 28% from operational emissions, from energy needed to heat, cool and power them, and the remaining 11% from materials and construction.”*
World Green Building Council, 2019
- Road transport $\approx$ ~12.6% of total global GHG (compared to <1% for air travel)
WRI, 2023 [right]

Figure 1: Greenhouse gas emissions by sector and end use, 2023



<https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors>



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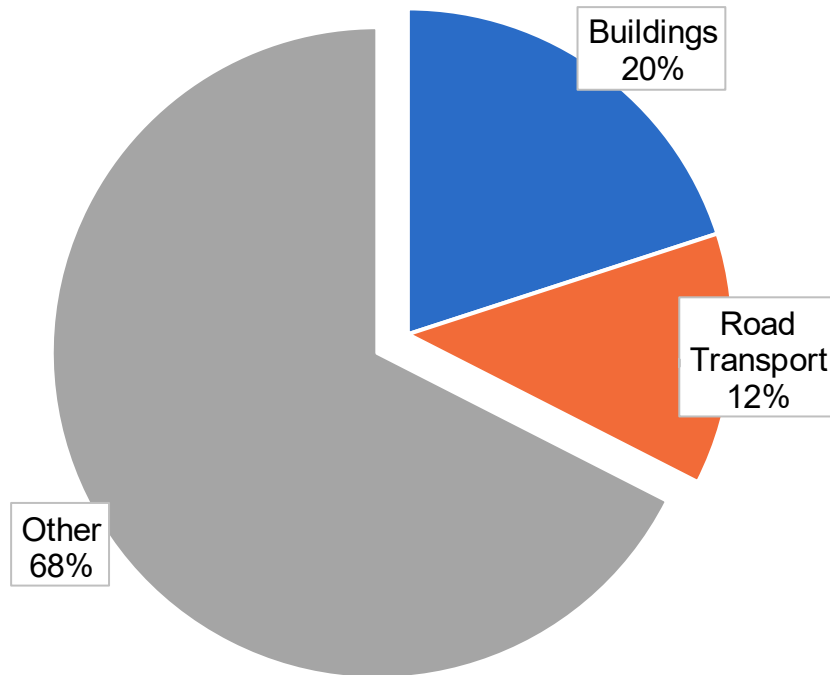
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WRI, 2023

Global GHG emissions



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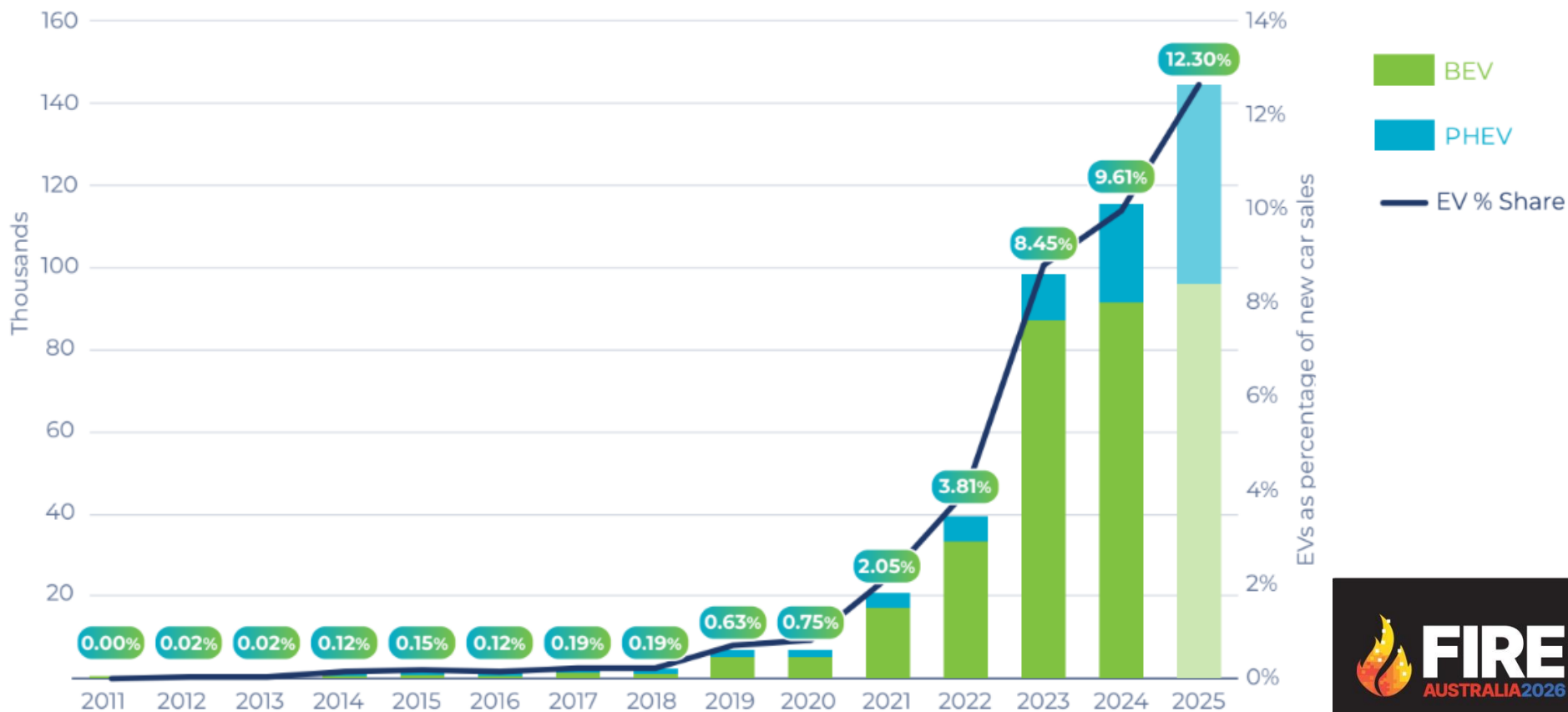
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EVs as percentage of new car sales in Australia





Australian light vehicle sales, 2025



ALL FUELS



ICE



BEV



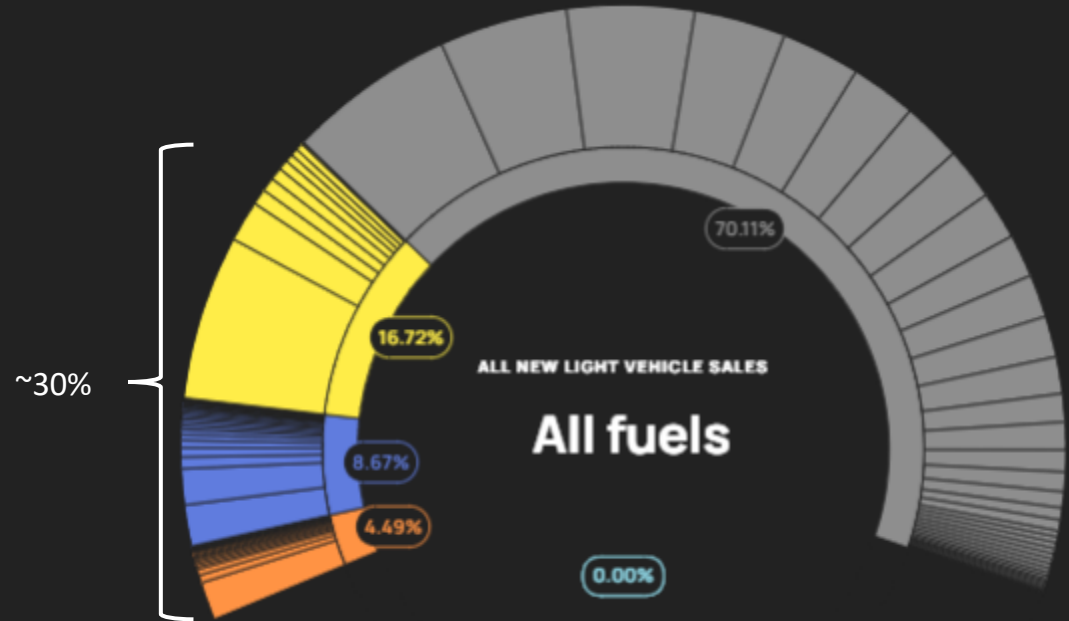
PHEV



HYBRID

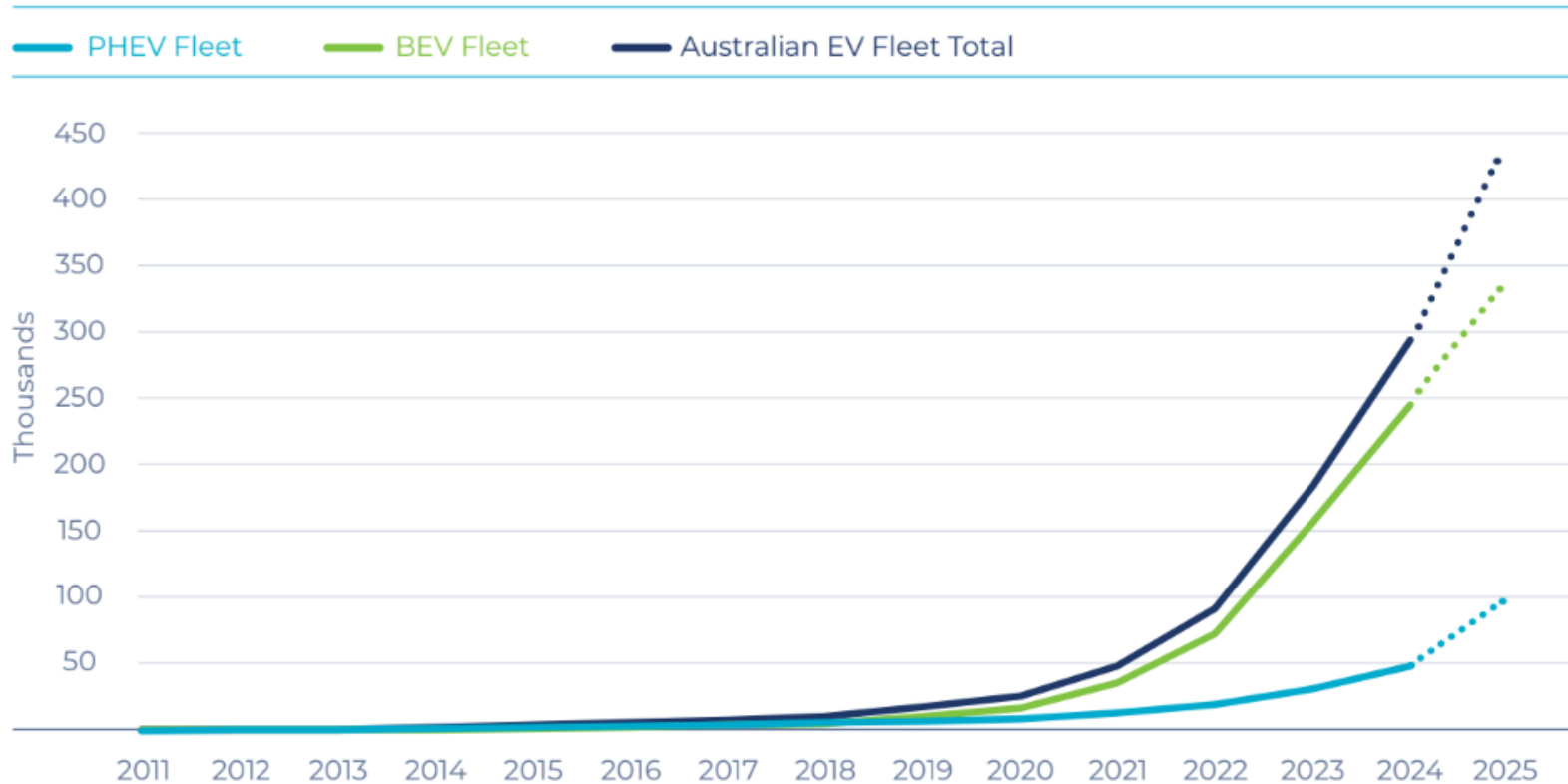


HFCEV



<https://www.aaa.asn.au/research-data/electric-vehicle/>

Australia's EV fleet



~2-2.5% of the total fleet

A rapidly decarbonising transport network

Technology > Motoring

Rising petrol uncertainty accelerates EV uptake across Australia with record insurance demand growth

Australia's transition to electric vehicles is gathering pace as consumer confidence hits new highs.

Andrew Hedgman

🕒 2 min read May 4, 2026 - 3:23PM NewsWire

<https://www.iag.com.au/newsroom/customer/ev-april-update>

- NRMA data: **the number of Australians exploring a switch to a BEV has more than doubled compared with this time last year.**
- **EV insurance quote requests were up 121% in April 2026 compared with April 2025.**
- Australian Automotive Dealer Association (AADA): **second-hand EV sales jumped by around 126% in March, more than doubling the previous monthly average**, suggesting more Australians are becoming confident buying used EVs and the EV fleet is aging.
- According to the Federal Chamber of Automotive Industries (FCAI) and the Electric Vehicle Council (EVC), March 2026 recorded a record 14.6% share of EV sales, nearly double the 7.5% recorded a year earlier.
- CSIRO modelling suggests that **by 2050, most vehicles in Australia will be electric.**



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What is our role as fire safety engineers?

SAFE + SUSTAINABLE

Support the safe and sustainable decarbonisation of the building and road transport sectors

Liaise with all parties – client, certifier, owner/operator, occupier, etc.

COMMUNICATE

DESIGN KNOWINGLY

Using an evidence- and risk-based holistic approach

Specify fire safety measures which are commensurate with the risk

COMMENSURATE



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2. Overview of carpark fire safety research completed for the ABCB



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Literature review for the ABCB

Overview

- Q3 2023 – Q1 2024.
- ABCB were 'investigating the adequacy of fire safety provisions within carparking structures'.
- Are current (NCC 2022) provisions adequate in light of changing vehicle designs?
- Literature review to provide a comprehensive outline of fire safety in modern car parks.

<https://www.abcb.gov.au/sites/default/files/resources/2024/296877-ABCB-ARUP-Fire-safety-in-carparks.pdf>

Australian Building Codes Board

Fire safety in car parks

Literature review

Reference: 296877-ABCB-ARUP-Fire safety in car parks

Rev A | 28 February 2024



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Job number: 296877-01

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Carparks

Open-deck

Open-deck carpark: A carpark in which all parts of the parking storeys are cross-ventilated by permanent unobstructed openings in not fewer than 2 opposite or approximately opposite sides, and –

- a) each side that provides ventilation is not less than $\frac{1}{4}$ of the area of any other side; and
- b) the openings are not less than $\frac{1}{2}$ of the wall area of the side concerned.



Enclosed



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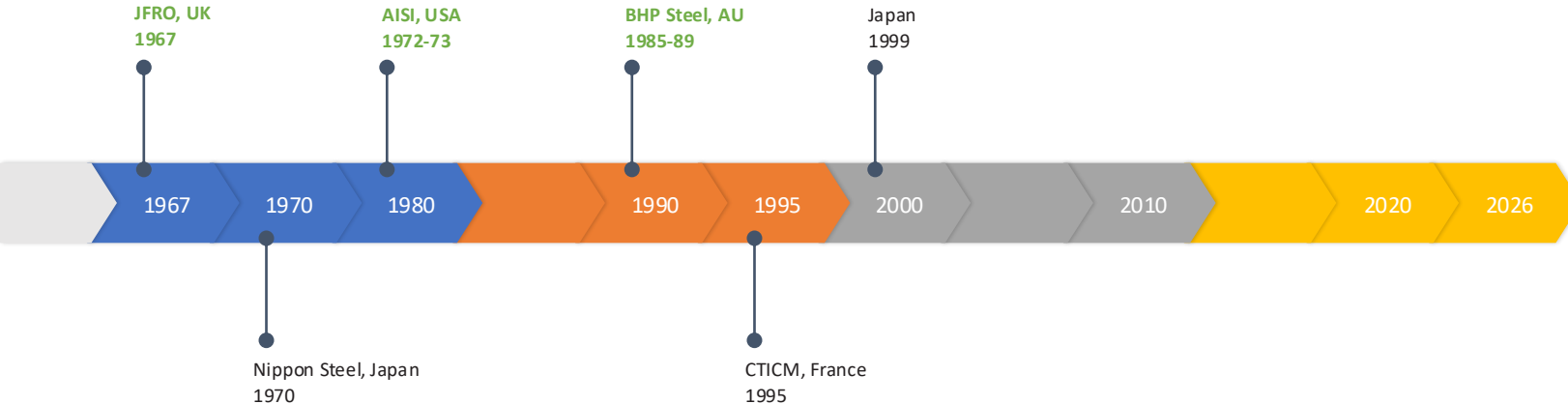
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- Summary of carpark design in Australia; NCC 2022 and brigade guidelines
- International precedent for carpark design (open-deck, enclosed, car stackers)
- **Seminal experiment research**
- **Fire incidents in carparks**
- Statistical data on carpark fires
- Hazards in the modern carpark

Seminal large-scale carpark fire experiments



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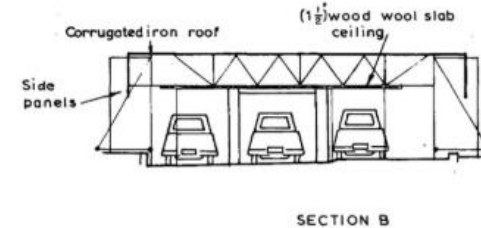
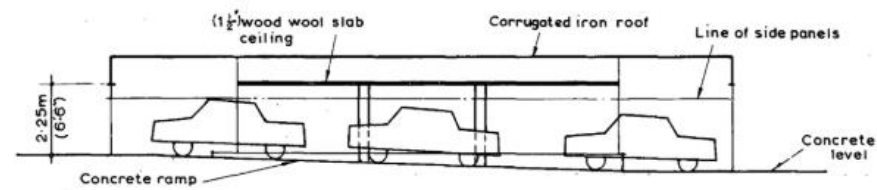


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JFRO, UK (1967)

- Three burns in a single storey test building, 167 m² floor area, 2.25 m f-to-c
- Nine vehicles in a 3x3 arrangement
- Variations in ventilation through façade; all open-deck
- Longer façades; 50% ventilation
- Short façade; open (two tests), closed (one test)

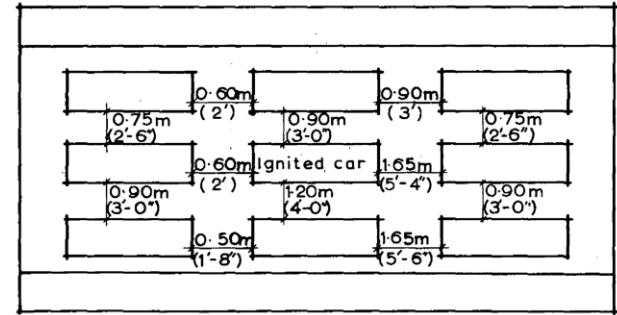


Credits:
Joint Fire Research Organisation



JFRO, UK (1967)

- Partially closed → more rapid fire growth.
- Open-sided → more severe fire.
- Low temperatures at the ceiling
→ unprotected composite steel and concrete deck ok.
- No fire spread to neighbouring vehicles.
- “It is likely that the fuel load of these cars [is] certainly different from modern cars”
(BRE, 2010).



TEST 2



Credits:

Joint Fire Research Organisation



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AISI, USA (1972-73)



Carpark building

- Existing open-deck carpark
- 69 x 55 m so 3,800 m2 area
- Only three cars...



Test at 5 mins

- Flames under the steel beam
- One car involved



Test at 37 mins

- Fuel tank engulfed
- Fire spread to rear of second vehicle
- No significant structural damage

Credits:

American Iron and Steel Institute



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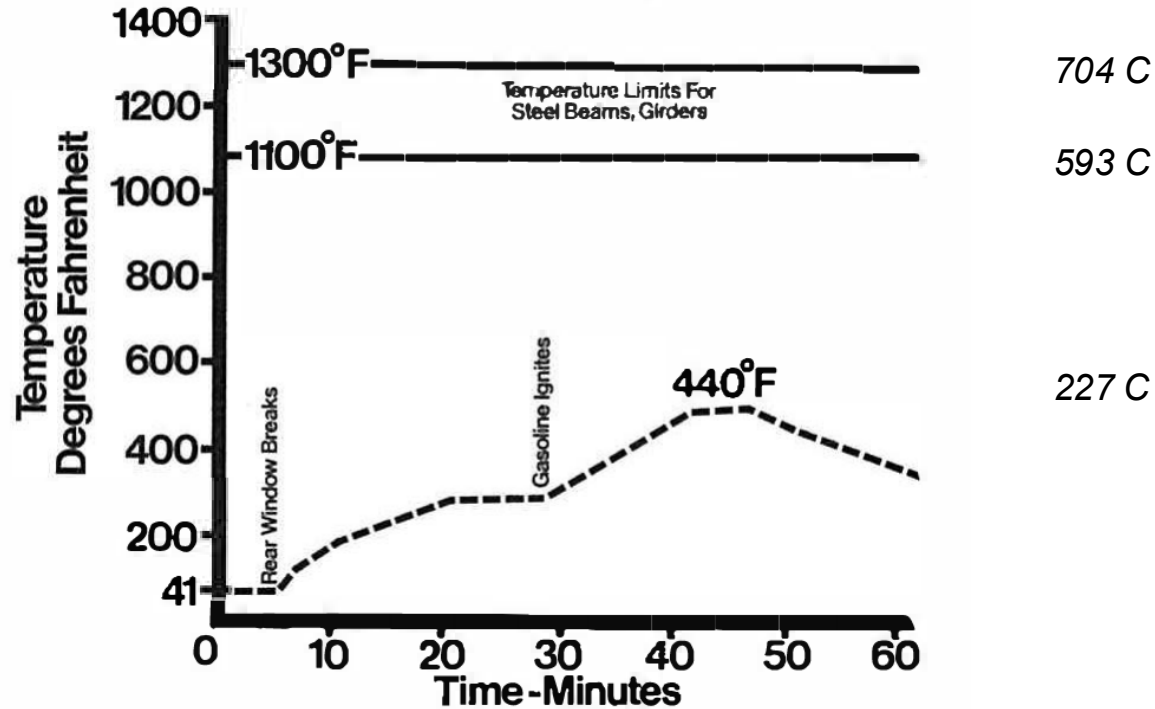
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Steel Girder Temperatures Over Gas Tank Scranton Fire Test - Oct. 15, 1972



Credits:

American Iron and Steel Institute



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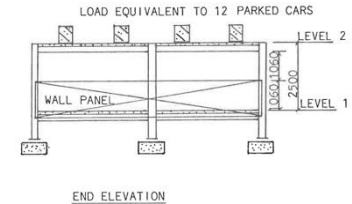
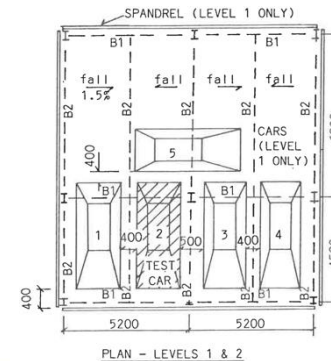
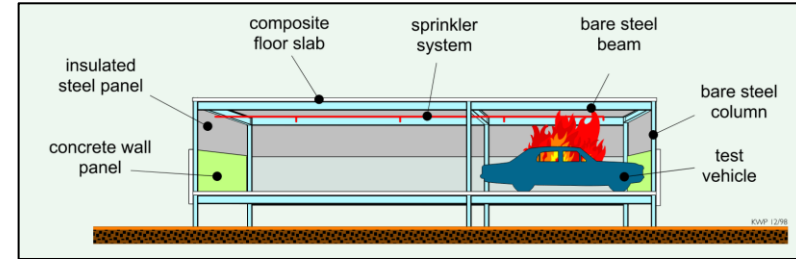
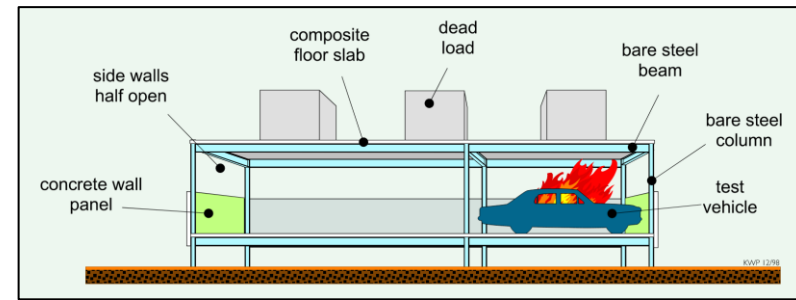


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BHP, Australia (1985-89)

- 10-15 year gap
 - → cars got larger, heavier, and include more plastics (notably also for the fuel tank)
 - → increasing use of light steel structures
- Most comprehensive set of 25 experiments
- Open, closed, and partially open carparks using thin steel members, composite deck.
- 120 m² floor area, 2.4 m f-to-c.
- Five cars used, manufactured between 1973-1982.
- Sprinkler and ventilation systems in the closed tests. Neither in the open-deck.
- Led to the NCC concessions on steel FRLs in open-deck carparks



Credits:
BHP Steel



Conclusions from seminal experiments

JFRO, UK (1967)

The results of these three experiments therefore confirmed the suggestion made as a result of the study of fire incidents in parked cars namely that the risk of fire spread from one vehicle to another in a car park building was small.

There are however three possible points on which the validity of this assumption could be questioned. They are:-

- (1) That the spacing of the cars used in the tests was too great
- (2) That the tests used only private cars and the presence of loaded commercial vehicles would give a much higher fire load
- (3) That only metal bodied cars were used and the presence of an appreciable number of plastic bodied cars would represent a different condition.

AISI, USA (1972-73)

A 15- to 20-mph wind blowing across the test site fanned the blaze. Undoubtedly the wind increased the intensity of the flaming, caused more direct flame impingement on the exposed cars, and increased the radiant heat exposure. Yet, despite localized ignitions, the two cars not more than two feet from the burn car received only minor fire and heat damage.

BHP, Australia (1985-89)

The tests showed that cars on fire within an open-deck car park constructed of unprotected steelwork will not lead to collapse of the structure. The test structure supported the loads throughout both tests and the temperatures measured in the steelwork showed that a significant margin of safety can be associated with the structure under the fire conditions experienced in these tests. The tests confirmed the findings of previous tests on similar car parks.

Experiment(s)	Year(s)	Maximum steel temperature recorded (°C)	
		Beam	Column
JFRO, UK	1967	275	360
Nippon Steel, Japan	1970	245	242
AISI, USA	1972-1973	226	-
BHP Steel, Australia	1985-1989	340	320
CTICM, France	1995	700	640
Japan	1999	700	-



Experiments

vs

Reality



Credits:

(L) American Iron and Steel Institute
(R) Merseyside Fire and Rescue Service



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Notable recent fire incidents

Location	Year	Vehicles involved	Injuries / fatalities	Type	Description
Oaklands Park (Australia) [75]	2023	5	None	Open air	Two vehicles destroyed, another three damaged.
Bankstown (Australia) [76]	2023	6	1 injury (smoke)	Open	Fire controlled by early intervention of fire and rescue services.
Ravensburg (Germany) [73]	2021	4	None	Closed	EV caused the fire. OH2 sprinkler system controlled the fire, before brigade suppressed.
Märsta (Sweden) [77]	2021	200	None	Closed	Roof collapsed, building demolished.
Fremantle (Australia) [78]	2021	4	1 injury (smoke)	Closed	Fire in the underground carpark of a residential block. Did not cause any structural damage.
Geraldton (Australia) [79], [80]	2021	7	None	Open	Caused by an electrical fault. 125,000 AUD damage.
Warrington (UK) [74]	2020	22	11	Closed	150,000 AUD damage. 11 people injured.



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Notable recent fire incidents

Location	Year	Vehicles involved	Injuries / fatalities	Type	Description
Markenhoven (Netherlands) [91]	2013	5	None	Open	Suppression system and the fire service controlled and extinguished fire.
Appelaar (Netherlands) [91]	2010	26	None	Closed	Structural damage led to repairs that took four months.
Stansted (UK) [92]	2010	24	None	Open air	High winds caused the flames to spread rapidly.
Bristol (UK) [68], [69]	2006	22	1 fatality	Open basement	Fire in a lower ground floor carpark which spread to the care home above.
Gretzenbach (Switzerland) [71], [72]	2004	100	7 fatalities, 3 injuries	Closed basement	Parts of the concrete ceiling fell down and buried 10 firefighters during the extinguishing work.
Schiphol (Netherlands) [93]	2002	90	None	Open	Caused by arson. Cars were only 40 cm apart. Some beams collapsed. 5M EUR damage.



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Notable recent fire incidents



Kings Dock Echo Arena, Liverpool, UK

- ~1,150 vehicles, NYE fire during event at the arena.
- Open-deck, 5,000 m² storey area, G+7 storeys.



Stavanger Airport, Norway

- ~200 vehicles, strong winds.
- Open-deck, 18,500 m² storey area, three distinct portions (1991, 2001, 2014).



Luton Airport, UK

- ~1,350 vehicles.
- Open-deck.
- Four firefighters and one airport staff member taken to hospital.

Credits (L to R):

Merseyside Fire and Rescue Service, Nordic Unmanned, The Guardian



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Key trends observed

- The **life safety risk posed by these fires is low**. Carparks are infrequently occupied.
- In some cases, fire brigades have retreated once the fire has spread to multiple vehicles (e.g. Kings Dock Echo Arena, Luton Airport) due to the size of the fire and signs of structural deterioration. Providing facilities and access for brigades is important (e.g. Stavanger).
- The **distance between vehicles**, and **the number of vehicles within the carpark**, are key factors. **A number of fires in carparks involving multiple vehicles have occurred at airports** (e.g., Stavanger, Edinburgh, Stansted, Schiphol and, recently, Sydney), **where cars are kept for significant periods of time in large carparks, with small distances between vehicles**.
- Adverse wind conditions can impact the efficacy of natural ventilation (e.g. Stavanger).
- Suppression was effective in controlling fires involving both ICEVs and BEVs (e.g. Ravensburg).
- Detection time and compartmentation are also important (e.g. Kings Dock Echo Arena).



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Kings Dock Echo Arena – through different lenses

- New 1,453-space, 8-storey car park (sprinklered), with EV charging points on every floor.
- Time (2.5 years):
 - Fire: 31 December 2017
 - Demolition: Oct 2018 – Jan 2019
 - Build: Feb 2019 – Summer 2020
- Economic cost:
 - £20m insurance
 - £3.6m demolition
 - £30m construction
 - £0.3m landscaping

> £50m



Credits:

Image: [Kings Dock Car Park, Liverpool | Willmott Dixon](#)

Sources: [Liverpool car park fire: Insurance payouts estimated at £20m](#)

[The Forgotten Impact of the Kings Dock Car Park Fire on Liverpool's Growth - Talk Build](#)



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Kings Dock Echo Arena – through different lenses

Economic cost (local):

- Cost of emergency response
- £4m of govt funding returned
- Lost parking revenue

Social cost:

- Council missed targets for job creation and generation, citing the fire as part of the reason
- Local business disruption
- Reputational damage



Credits:

Image: [Kings Dock Car Park, Liverpool | Willmott Dixon](#)

Sources: [Liverpool car park fire: Insurance payouts estimated at £20m](#)

[The Forgotten Impact of the Kings Dock Car Park Fire on Liverpool's Growth - Talk Build](#)



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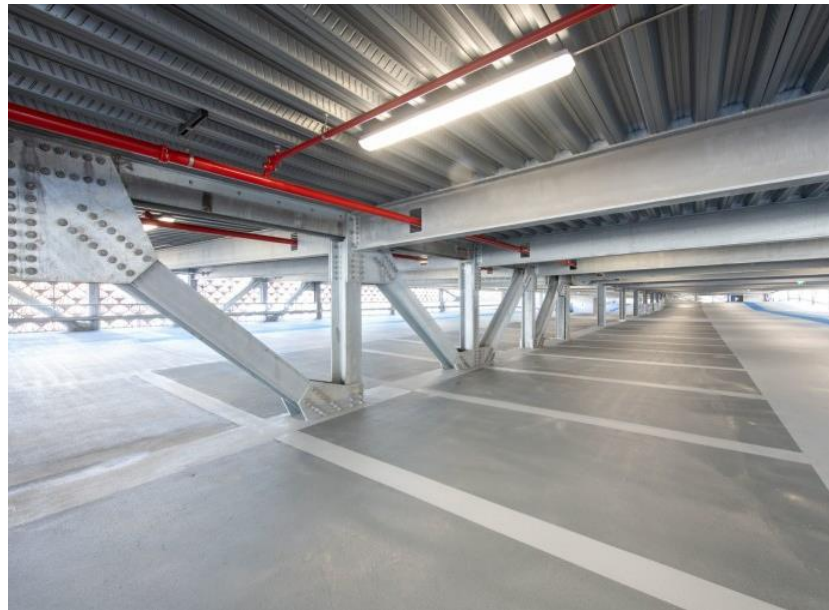
Kings Dock Echo Arena – through different lenses

Environmental cost:

- Emissions from the fire itself? Not quantified.
 - Vehicles (embodied carbon):
 - ICEV: ~ 5-10 tCO₂e, BEV: ~ 10-20 tCO₂e [1]
- Assume 1,400 vehicles, 5% BEVs [2] → ~ 11,000 tCO₂e
- Demolition:
 - Assume 40,000 m², 0.05 tCO₂e/m² [3] → ~ 2,000 tCO₂e
- Existing materials recycled (potential offset)?
- New build (embodied carbon):
- Assume 40,000 m², 0.5 tCO₂e/m² [4] → ~ 20,000 tCO₂e
 - Operational carbon savings? TBC.

TOTAL: ~ 33,000 tCO₂e (roughly)

Economy flight from SYD→MEL ~ 0.2 tCO₂e (per ticket), so equivalent to
165,000 economy tickets from SYD-MEL [5]



Credits:

Image: [Kings Dock Car Park, Liverpool | Willmott Dixon](#)

[1] International Energy Agency (IEA)

[2] [UK ev market share 2026: latest electric car registration stats | zapmap](#)

[3] CityLoops

[4] Carbon Leadership Forum (CLF) – WBLCA Benchmark Study (2025)

[5] [Calculate flight emissions – flight CO2 calculator | myclimate](#)



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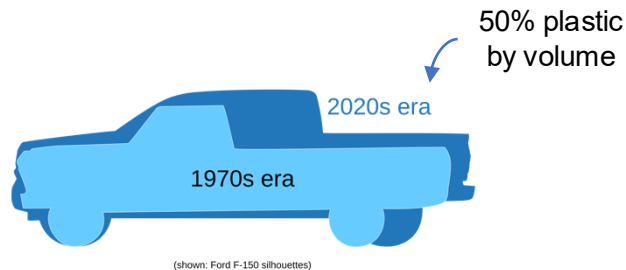
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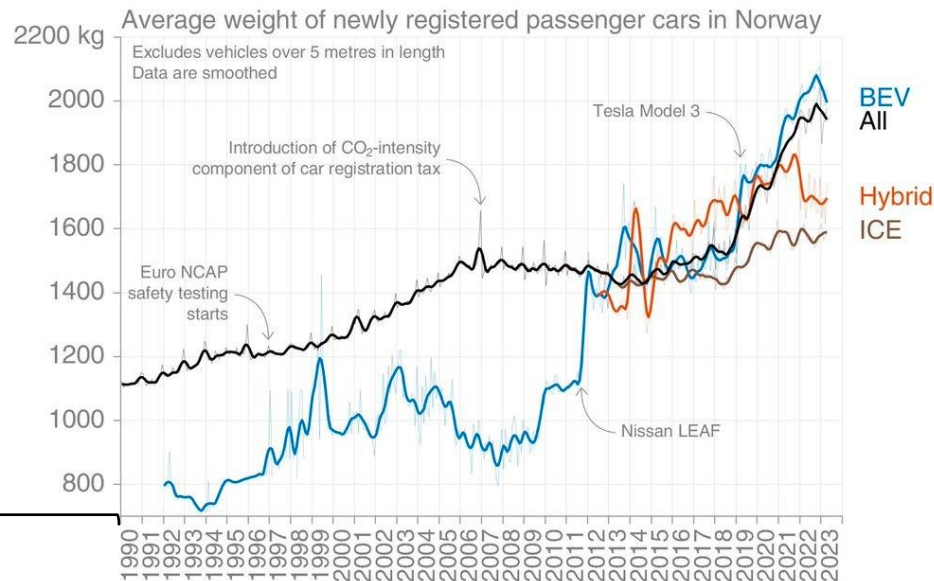


Modern vehicles



Seminal carpark fire experiments

1967



Credits:

<https://hannahritchie.substack.com/p/weighty-issue-of-electric-cars>



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EUROPEAN PARKING ASSOCIATION

Positively promoting parking solutions for sustainable mobility

EPA Fire Safety

Toolbox

FIRE SAFETY GUIDANCE FOR E-BIKES IN OFFICES

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Office for Zero Emission Vehicles (OZEV)

T0194 – Covered car parks - fire safety guidance for electric vehicles

Interim guidance to support parking and/or charging of electric vehicles and the installation of electric vehicle chargepoints in covered car parks

Issue 1 July 2023



Issue 1 July 2023 (See page 10 for further details)

ARUP

Advisory notice



Electric vehicles in buildings

To support Australians making the switch to electric vehicles (EV), the National Construction Code (NCC) is requiring more buildings to be ready for EV charging.

The global experience of EVs to date indicates they have a lower likelihood of being involved in a fire than internal combustion engines, but the characteristics of battery fires are different to liquid fuel fires.

To ensure we understand and respond proportionately to any updated evidence of EV charging risks, the ABCB has reviewed the approaches taken by international regulators, including those countries with greater uptake of EVs. We have also engaged Australian research team EV FireSafe to help develop a set of recommendations that can support the safer installation and use of EV chargers without being an unreasonable barrier to adoption. The full report from EV FireSafe, on which these provisions are based, can be found here.

We believe the recommendations set out in this advisory note are low cost, have low visual impact, are easily implementable and reflect the better practices already being adopted by many reputable suppliers. These recommendations will help reduce the risk of substandard equipment or installation practices emerging as the EV charging industry grows.

The ABCB will continue to work with other government bodies and emergency response agencies to review the latest evidence on EV charging trends from around the world. We will review and update our guidance and/or regulatory response as needed.

June 2023, Version 1.0 - Commonwealth of Australia and States and Territories of Australia 2023, published by the Australian Building Codes Board



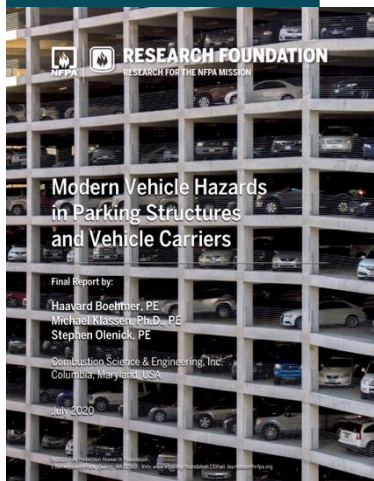
Fire Safety for Carparks



GUIDELINE
Version 1.0
15 September 2023
Document ID: 0110

SUSTAINABLE
TRANSPORT
FORUM

FIRE SAFETY – ELECTRIC VEHICLES AND CHARGING INFRASTRUCTURE



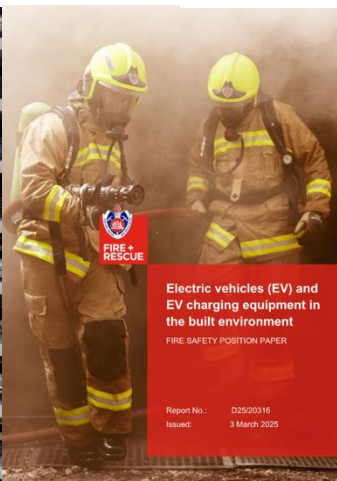
Modern Vehicle Hazards in Parking Structures and Vehicle Carriers

Final Report by:

Haavard Boelmer, PE
Michael Klassen, Ph.D., PE
Stephen Olenick, PE

Combustion Science & Engineering, Inc.
Columbia, Maryland, USA

July 2020



Electric vehicles (EV) and EV charging equipment in the built environment

FIRE SAFETY POSITION PAPER

Report No.: D25/20316
Issued: 3 March 2025



ENGINEERS
AUSTRALIA
Society of
Fire Safety

DRAFT Practice Guide for Fire Safety of Carparking Structures Containing Battery Electric Vehicles

SFS Monitor Comment Version 26 October 2023

Prepared by
Society of Fire Safety
Engineers Australia

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March 2023

ARUP

Electric Vehicles (EVs) and Charging Infrastructure

Technical Info on Fire Safety



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AUSTRALIA2026

3. What happened next? Summary of NCC changes



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National Construction Code (NCC) updates

NCC 2022

- E1D5 25 m trigger for sprinklers does not apply to standalone open-deck carparks.
- Sprinklers required for carparks with > 40 vehicles **except open-deck carparks** (E1D9).
- FRL concessions allow **nominal FRLs for Type A (S5C19) and B (S5C22) carparks**:
 - Open-deck, or
 - Enclosed, sprinklered, standalone, or
 - Enclosed, sprinklered, fire-separated

NCC 2025 Public Comment Draft (PCD)

- **Open-deck carparks > 25 m require sprinklers regardless of multi-classification or standalone** (E1D5).
- **Any carpark with > 40 vehicles or a car stacker needs sprinklers** (E1D9).
- **FRL concessions for open-deck carparks only applicable if carpark is sprinklered.**

NCC 2025

- E1D5 25 m trigger for sprinklers does not apply to standalone open-deck carparks.
- Class 7a carparks – **except open-deck carparks which are separate buildings** – require sprinklers if > 40 vehicles, or a carstacker (E1D9).
- FRL concessions allow **nominal FRLs for Type A (S5C19) and B (S5C22) carparks**:
 - Open-deck, standalone, or
 - Enclosed, sprinklered, standalone, or
 - Enclosed, sprinklered, fire-separated



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What does that mean in practice?

Carpark typology	Enclosed	Enclosed	Enclosed	Open-deck	Open-deck	Open-deck
Fire-separated?	Y	Y	Y	N/A	N/A	N/A
Classification	7a	7a	7a	7a	7a	7a
Type of construction	A	A	A	A	A	A
Effective Height	< 25 m	> 25 m	< 25 m	> 25 m	> 25 m	> 25 m
Development	Multi-classification (mixed use)	Multi-classification (mixed use)	Multi-classification (mixed use)	Separate building (standalone)	Multi-classification (mixed use)	Separate building (standalone)
No. of vehicles	< 40	< 40	> 40	> 40	> 40	> 40
Car stacker?	N	N	N	Y	N	N
Sprinklered per DtS?	N	Y	Y	Y	Y	N
FRL concessions permitted?	N (unless sprinklered)	Y	Y	Y	N	Y



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Why?

Home > Have your say > Decision Regulation Impact Statements

Decision Regulation Impact Statements

A Decision Regulation Impact Statement (RIS) incorporates comments and feedback from submissions received on the [Consultation RIS](#). It assists decision-making about adopting a regulatory proposal.

A Decision RIS is only available after decision makers have made a determination on the matter, as it reflects the outcome of the process.

NCC 2025 Impact Analysis reports

The following documents are available:

- [Water management DRIS](#)
- [Commercial energy efficiency DRIS](#)
- [Condensation mitigation NCC 2025 - Impact Analysis](#)
- [Adequacy of female sanitary facilities - Impact Analysis](#)

Carpark fire safety –
Impact Analysis not available?

NCC 2025 - Carpark fire safety changes



“There is no change to sprinkler concessions for open-deck carpark that are separate buildings. These carpark continue to be exempt due to their **lower occupant risk.**”

What has changed?

NCC 2025 includes updated carpark fire safety provisions to better respond to the fire risks associated with modern vehicles.

The changes increase the use of active fire suppression and passive fire resistance measures, particularly in carpark located beneath other building classifications.

The changes include:

- a requirement for sprinkler protection for open-deck carpark when they form part of a multi-classified building and exceed 40 vehicles
- reduced fire resistance level (FRL) concessions for certain open-deck carpark
- mandatory sprinkler protection for all Class 7a carpark containing car stackers, regardless of carpark type.

There is no change to sprinkler concessions for open-deck carpark that are separate buildings. These carpark continue to be exempt due to their lower occupant risk.

Fire safety objectives + holistic thinking become critical

NCC objectives:

- Provide adequate occupant life safety
- Assist the protection of other property
- Facilitate fire brigade operations

What about:

- Client risk appetite
- Future-proofing
- Business / operational continuity
- Safeguarding against reputational damage
- Long-term sustainability and economics



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So, what do we do?

- Communicate clearly to all stakeholders that a fire event similar to Luton Airport, Stavanger Airport, Kings Dock Echo Arena *is* a possibility.
- Is that acceptable? Potentially. It depends. Sometimes.
- Other fire safety measures *can* be strengthened as part of a fire strategy, e.g.:
 - Stair cores that have not had the FRL concession applied – place of relative safety for brigade.
 - Means for early detection and alarm.
 - Proper fire-stopping of penetrating elements.
 - Placement of open-deck ventilation on all sides such that there is sufficient remaining if one/two sides are impacted by wind.
 - Good perimeter access for external fire-fighting inc. external hydrants.
 - Fire separation of other hazards – particularly bike stores (e-bikes).
 - Any other ideas?
- In some cases, sprinklers (i.e. above the NCC provisions) makes sense.



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Please, just don't do this:

NO ELECTRIC
VEHICLES
PERMITTED
EVs (INCLUDING HYBRIDS)
ARE PROHIBITED FROM
ENTERING THIS BUILDING

LOW CLEARANCE

2 . 3 m

4. Recent experience and challenges



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What sprinkler design density is appropriate?

Sprinkler code	Carpark design density	Comments
AS 2118.1 (2017)	Ordinary Hazard 2 (OH2) 5 mm/min over 144 m ²	Aligns with BS EN 12845. Max. of 12m ² coverage per sprinkler (= 1 carparking space → 12 carparking spaces covered simultaneously).
BS EN 12845 (2015)	Ordinary Hazard 2 (OH2) 5 mm/min over 144 m ²	An updated version of EN 12845 is currently in development. Understand OH3 being considered (same density, larger area).
LPC Rules (UK insurance group) Technical Bulletin 229 (2022)	High Hazard Process 3 (HHP3) 12.5 mm/min over 260 m ²	The design density was increased in the 2022 revision from OH2 to HHP3, increasing from 5 to 12.5 mm/min.
NFPA 13 (2025)	Ordinary Hazard Group 2 (OH2) 8.1 mm/min over 140 m ²	The design density was increased in the 2022 edition from OH1 to OH2, increasing from 6.1 to 8.1 mm/min.
FM Data Sheet 3-26 (2025)	Hazard Category 3 (HC-3) 12 mm/min over 230 m ²	The design density was increased in the 2021 edition from HC-2 to HC-3, increasing from 8 to 12 mm/min.



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What FRL is appropriate?

- 60 minutes optimal cost-benefit
- 15 minutes with sprinklers broadly comparable

To complement the optimisation outputs, a J-Value assessment [4] compared the benefit-to-cost ratios of different interventions. Across all three building heights, increasing structural fire resistance to approximately 60 minutes provided the most favourable balance between safety benefit and cost, with ratios demonstrating significant returns relative to current policy expectations / recommendations. For the four- and eight-storey cases, sprinkler protection combined with 15 minutes of structural resistance offered a broadly comparable benefit-to-cost ratio, while the twelve-storey case also exhibited a positive return when sprinklers were included.

CPD/004/122/039

Real Fires: Open-sided car park
fire resistance

WP 3B: Life-time cost optimisation (LCO) study



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5. Looking forward



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“How does a responsible architect interpret a brief for a carpark in the twenty first century? We think about the structure’s life and future beyond carbon and cars.”

Hill Thalís
architects + interior Projects



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Peckham Levels



Credits:

<https://turner.works/work/view/peckham-levels>

Carl Turner Architects / Turner.Works



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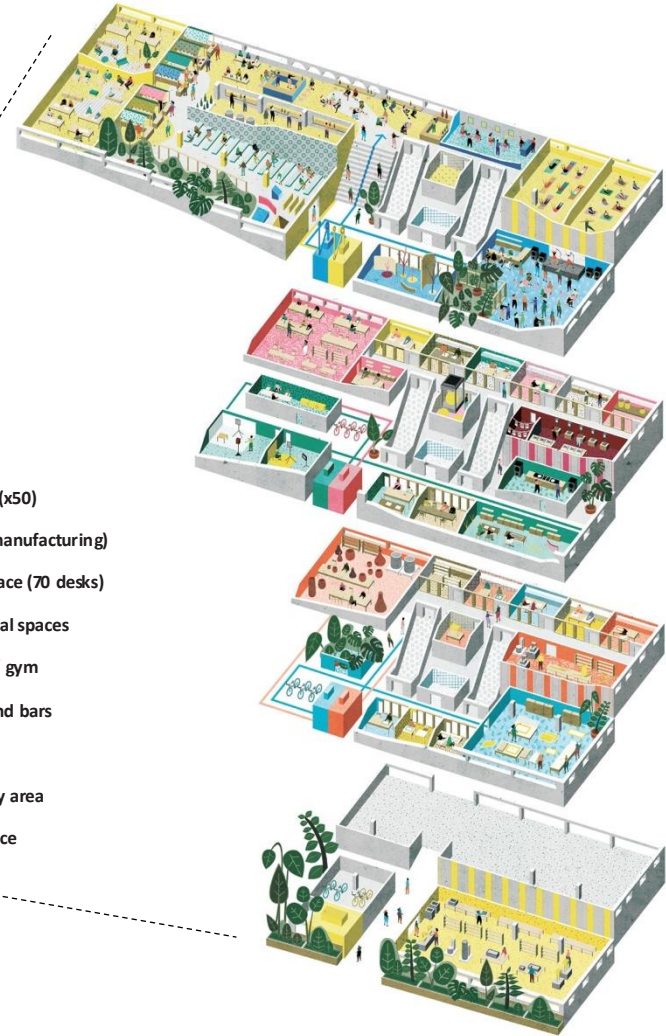
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Peckham Levels



- Rooftop bar
- Cinema
- Artist studios (x50)
- Workshops (manufacturing)
- Coworking space (70 desks)
- Music rehearsal spaces
- Yoga studios / gym
- Food kiosks and bars
- Restaurants
- Children's play area
- Exhibition space



UNSW N18 extension

Moore Park precinct



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Summary



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Summary

- Both the buildings and transport sectors are big-hitters in terms of global GHG emissions.
- EVs are here, and adoption has potential to be quicker than forecast.
- As fire safety engineers, we must support safe and sustainable development, using an evidence- and risk-based, holistic approach. Fire safety measures need to be commensurate, considered, and well-communicated.
- The commonly cited assumption in 20th century fire safety literature based on seminal carpark fire experiments is that fire spread between cars is a rare event. This is no longer appropriate for modern vehicles.
- In recent years, large-scale carpark fire incidents have made headlines. The life safety impact was low.
- These events should be assessed through a variety of lenses (see SFPE Foundation future research).
- Globally, building codes are slow to react. The regular cadence of NCC updates is a strength for Australia.
- NCC 2025 strengthens carpark fire safety provisions, but not as far as in the Public Comment Draft (PCD).
- This puts the onus on professionals to 'design knowingly' – determining design drivers, acknowledging risks, and devising solutions which are commensurate, considering the context.



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Thank you



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Q&A

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