

1 INCIDENT

1.1 SUMMARY

- 1.1.1 A report by the Independent newspaper stated that around 9:00 pm on Tuesday 10th October 2023 an extensive and largely uncontrolled fire, apparently caused by a diesel vehicle, spread through the new Terminal Car Park 2 (MSCP2) at Luton Airport, potentially damaging up to 1500 vehicles. The car park suffered some structural collapse.
- 1.1.2 There were no reports of injuries to members of the public, but five people - four firefighters and an airline official - were treated in hospital.
- 1.1.3 There is no suggestion the blaze happened intentionally.
- 1.1.4 Mr Andrew Hopkinson of Bedfordshire Fire and Rescue Service said: "We are already talking to the airport about ensuring that any future, and the existing, car parks have sprinklers fitted because this building is not sprinkler protected. Sprinklers may have made a positive impact on this incident."

2 RETROSPECT

2.1 APPROVALS

- 2.1.1 The Car Park planning application 17/00004/GPDOPD) was submitted on Wednesday 13th September 2017 and granted on Friday 19th January 2018.
- 2.1.2 Much of the process revolved around if the development were permitted and the environmental impact, though it is noted that Bedfordshire fire services noted a requirement for hydrants to be provided but little else by way of fire safety.
- 2.1.3 The plans offer no details of an engineering or safety design and do not reference design standards.
- 2.1.4 Such matters are almost certainly the province of Building Regulations, however plans deposited with a local authority under the Building Regulations are not documents which the public are entitled to inspect under the Local Government Act 1972. This is an appalling lack of transparency when a public facility such as this is the subject. **It is doubly so when the authority making the regulatory approval is also the beneficiary of any leniency in respect of the costs involved.**
- 2.1.5 Accordingly, it is outside of my ability to review the detail or even to know if and when design details were submitted, how they were evaluated and what safety considerations were considered, so I may only make remarks of a general nature.

3 CONSIDERATIONS

3.1 MATERIALS OF CONSTRUCTION

- 3.1.1 The increase of the market share for steel and composite car parks suffers from a lack of information on how these structures behave under exceptional localised fire. Essentially there are two construction forms.
 - a) Concrete : The Concrete Centre points out the concrete structures are durable, resistant to vibration and, pertinent here, inherently fire resistant, so concrete structures generally do not require additional fire protection. They state that "This removes time, cost, use of a separate trade and ongoing maintenance to **apply fire protection.**" Note the assumption is that car park structures in other materials require applied fire protection. **Question : Was fire protection applied to MSCP2?**
 - b) Steel : Metpark UK advises "steel is quick to erect, which reduces construction timescales, and therefore car park construction costs." It also states "Steel is fire resistant, robust, vandal proof and capable of easily accommodating emerging car park related technology. It is true that steel is "fire resistant" in that it is difficult (but not impossible) to set it on fire, however a structure made from it is generally not stable under fire conditions and as a result many designers utilise various means to prevent heat weakening a structure.

- 3.1.2 Both materials have a life of approximately 50 years but a reinforced concrete is inherently fireproof but possibly more costly, and certainly slower, to build.

4 DESIGN DETAIL

4.1 DESIGN FOR FIRE

- 4.1.1 To verify the fire safety of a car park structure, an assumption has to be made on the possible fire load in a car park. The fire load is defined as the total amount of combustible material in a certain area, measured in its heat of combustion (MJ). When a car is on fire, a high peak in the rate of heat release is expected in the first fifteen minutes.
- 4.1.2 Regulations in the UK, where sprinklers are not fitted, require the consideration of a heat release rate, in that first 15 minutes, of 8MJ and consider 3 cars are on fire. Were sprinklers to be fitted then these figures reduce to 4MJ and 1 car.¹ **Question – Did building regs consider the impact of a 3-car fire and heat release of 8MJ in 15 minutes on the structure? Did they consider the risk of fire spread?**
- 4.1.3 SCOSS² alert in February 2018 "Fire in Multi-Storey Car Parks" relates the facts concerning a severe fire at the Liverpool Echo Arena Multi-Storey Car Park (MSCP) on 31st December 2017 that gutted the seven-storey building and up to 1,400 cars were destroyed. - WHO SHOULD READ THIS ALERT? This Alert is aimed at those who own, commission, design, construct, or maintain Multi-Storey Car Parks (MSCPs). **Question: Who in the ownership, design, operation and approval of this facility read this alert?**
- 4.1.4 In that document, among other recommendations, it is stated that some lessons from the Liverpool fire should be considered by designers and their clients: -
- Is the fire rating for car parks given in Part B³ of the Approved Documents sufficient given the nature of the car park in question? Remember that Approved Documents are only the minimum standards.
 - Approved Document B requires only 15 minutes fire resistance for open sided car parks and provides no explicit guarantee against structural damage, loss of business continuity, and other consequential losses.
 - Is the design sufficiently robust to withstand an extreme event such as a major fire without collapse?
- 4.1.5 **Question – were these recommendations seen or reviewed in the design and build process? How was the 15-minute fire resistance of the design met without fireproofing?**
- 4.1.6 Notwithstanding 4.1.4 Building Regulations 2010: Approved Document B fire safety volume 2 buildings other than dwellinghouses states:-
- B3.
- (1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.
 - (3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following
 - (a) sub-division of the building with fire-resisting construction;
 - (b) installation of suitable automatic fire suppression systems.
- 4.1.7 **Question: How were either of these requirements addressed or met within the design?**

¹ The Fire Safety of Car Parks Focussing on Structural Damage - K.Terlouw, Thesis for master degree Building Engineering at the Technical University of Delft, October 2019

² Bulletin issued by Collaborative Reporting for Safer Structures UK (CROSS-UK)

³ Fire safety: Approved Document B Building regulation in England covering fire safety matters within and around buildings.

4.2 SPRINKLERS

- 4.2.1 As far back as 1987, Australian researchers Thomas and Bennett⁴ reported the findings of nine tests, involving twenty cars, looking at fire development in *closed* car parks. The results were:
- A sprinkler system was effective at controlling a developing fire.
 - A sprinkler system was equally as effective at controlling a fully developed fire.
 - Without sprinklers, fire is likely to spread from car to car.
 - With sprinklers, spread of fire is unlikely.
- 4.2.2 While the above relates to closed car parks, it equally applies to open car parks
- 4.2.3 In 2006, the Communities & Local Government (CLG) Sustainable Buildings Division commissioned the Building Research Establishment (BRE Global) to carry out a three-year project looking at the problems associated with fires in car parks. The evidence derived from global research and research conducted by the BRE in their 2010 report "Fire spread in car parks"⁵ considered the effectiveness of sprinklers controlling fires in car parks and said; "the incidence of fatalities and injuries is zero and the property loss is around 95% lower than that of an uncontrolled fire."
- 4.2.4 The response to the 'warning signs' back in 2006 about fires in car parks from the government was admirable and the work carried out by the BRE was excellent; its report is still as valid today as it was when published. However, there is little evidence that anything other than scant attention has been paid to this research.⁶ **Question: Were LBC and the other parties lackadaisical in their approach to safety and should they be running an airport?**
- 4.2.5 The National Fire Chiefs Council's (NFCC) position in relation to car parks in 2018 was as follows: "The NFCC recommend that consideration is given to installing sprinklers in open sided car parks to protect property, including the fabric of the building. While there have been few incidences of fatalities in car parks, there have been recorded fatalities to firefighters due to structural collapse abroad."
- 4.2.6 **Question: Why were sprinklers not fitted in the car park?**
- 4.2.7 **Question: Can the Airport Operator demonstrate the application of a risk-assessed approach to help ensure the car park structure was safely maintained?**
- 4.2.8 **Question: Was this facility built for minimum cost without consideration of the consequences of fire, to the detriment of its users?**

⁴ Municipal Engineering in Australia, BHP Fire Tests Prove the Value of Sprinkler Systems, pp.3-13, Thomas, I., Bennetts, I., September 1987

⁵ BRE, Fire spread in car parks, BD2552, December 2010

⁶ pbc Today - Fire suppression in car parks March 13, 2018