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Liverpool car park blaze exposes flaws in design guidelines

The conditions that allowed a fire to rip through a multi-storey car park in Liverpool in December, destroying 1,300 cars, have been described as a "perfect storm".

Alasdair Beal, principal associate civil and structural engineer at civil engineering consultancy Thomasons, says he believes changes to the way cars are designed could have made current structural design guidelines for car parks need updating.

"It's an accumulation of a whole string of changes in the construction of cars and car parks," says Beal.

"Each one is not a big change, but when you add them up, it has the combined effect of turning something that was practical and worked [the existing guidelines], into something that is impractical and doesn't work."

No one was hurt in the fire, which occurred on New Year's Eve, but it destroyed all 1,309 cars in the seven storey car park and damaged the reinforced concrete structure beyond repair. At the time, the car park was full as an equestrian event was underway at the nearby conference centre.

Beal said his first observation was that the car park was full. He says this would have maximised the potential fire load and the risk of the fire spreading.

The blaze also burned through the concrete in the central roadway, exposing the reinforcement in large areas. In other fires, the structure under the cars would generally sustain the most damage, he says.

1,309
Number of cars destroyed in the Liverpool car park fire

A reason for this could be that cars are now designed with plastic fuel tanks, says Beal. These burn through more quickly than steel tanks, and could have released fuel onto the structure of the car park. A natural deflection at the mid span of the structure would then have caused the fuel to run into the centre and pool, further fuelling the fire in that area.

An increase in the use of diesel cars would be different to the assumptions on which the design guidance for the structure was based, Beal adds. In a fire, he says, diesel tends to form burning pools and rivers rather than vaporising and exploding like petrol. This would also have enabled the fire to spread more easily.

Wider cars with more flammable components and bigger fuel tanks are all now factors in managing fire risk in car parks, Beal says.

The engineer says the Liverpool fire should act as a warning and that the guidelines should now be reviewed. He also warns that changes to design guidelines could take years to come into effect and would not affect the existing car park stock.

"It's a warning – if it could happen there once, it could happen again," says Beal. "If the analysis is right, then it means that the risk of fire is now much greater than it was before, and that applies to new and existing car parks.

"It's a warning – if it could happen once, it could happen again

"Something that you also have to be looking at is changing the management of the existing car parks and what can you do to those to decrease risk."

Liverpool City Council said it was still awaiting a report on the condition of the car park from structural engineers, but investigations had been complicated by the lack of access to the unstable structure.