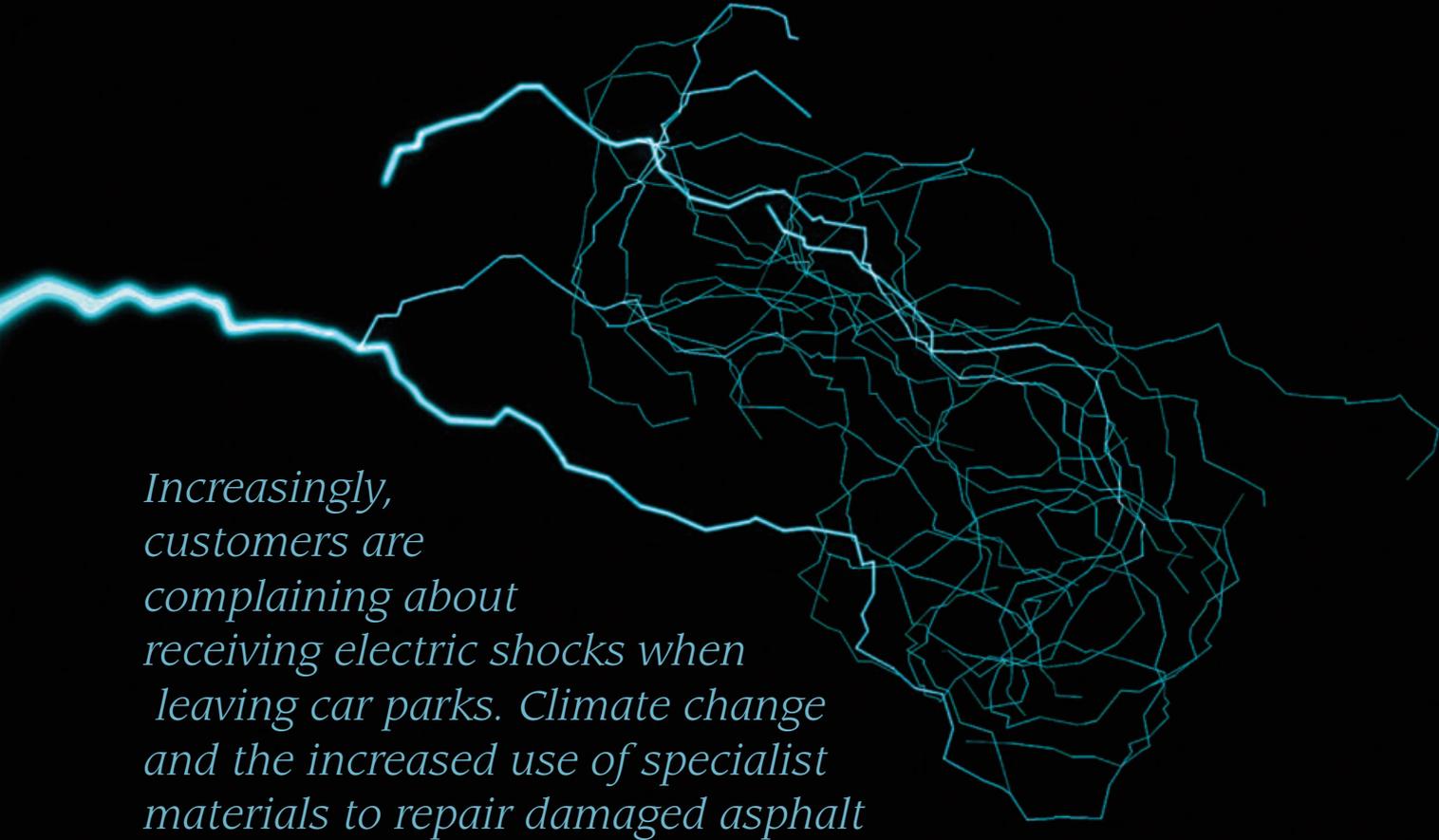


# PREVENTING A SHOCKING EXPERIENCE



*Increasingly, customers are complaining about receiving electric shocks when leaving car parks. Climate change and the increased use of specialist materials to repair damaged asphalt decks may be responsible. However as **John Osborne** explains treating the problem can be as difficult as formulating a strategy for eliminating it from a car park.*

**Most people have received small shocks at one time or another. Fit, healthy people are not usually bothered. However some people who have pacemakers have been alarmed. Some shopping centre owners have also been worried, especially in the USA where litigation is often the customer's first response when something goes wrong.**

"Vehicles rolling on a road surface generate an electrostatic charge that can build up to a high voltage on the vehicle", said Dr Jeremy Smallwood, a consultant who runs Electrostatic Solutions Limited. "At the same time the charge tends to dissipate to ground

through the vehicle tyres and the ground's surface. Charge generation halts when the vehicle comes to a standstill". He added that "usually the accumulated charge drains ("decays") away before it can cause shocks or other nuisance to the vehicle users".

According to Dr Smallwood "a person may reach out from the vehicle window while high voltage remains on the vehicle. They may experience a shock as they touch an earthed metal surface such as a ticket machine".

"We have been told this is a common problem", said Michelle Barkley, Technical Director, Chapman Taylor LPP. This is a firm

of architects, designers and planners and is a member of the BPA. Barkley believes that it "arises from the low electrical discharge characteristics of modern floor coating materials containing plastics (polymer modified asphalt and epoxy coating). This is similar to problems that can be experienced with nylon carpets." She said that the firm has been told that the solution is to use a high conductivity material in the ticket machine bay".

In theory the problem is easy to treat. In practice it is complicated because many things may be helping a charge to build up, including the ramps in the car park. This means that it is likely to be extremely diffi-

cult to prevent customers from receiving electric shocks.

Jason Benjamin has investigated the problem. He is parking manager for Cheltenham Council. He said that it was occurring in the car park serving Regent Arcade in Cheltenham, Gloucestershire.

"We used to have one lane out of it", explained Mr Benjamin. "Then when we installed a pay on foot machine in 2004 we changed to two lanes out of it so we moved the entry barriers. We had to relocate the machine to accommodate the two new lanes. The previous year the shopping centre which owns the structure and which is responsible for the maintenance put asphalt on the car park. Water was leaking into the units below". He said that the areas where the most asphalt was put down were where the two lanes had been created.

"At the time we didn't have an electrostatic problem and we were not aware of any", continued Mr Benjamin. "In the periods of hot weather people started complaining that they were getting a static discharge from the machine."

He thought the problem could be solved by ensuring that the ticket machine was adequately earthed. Parkeon, which claims to be a leading supplier of such machines, said that there is a legal requirement to provide optimum protection.

That may be so but Mr Benjamin said he has met people with pacemakers who were scared that the shock would affect their devices. However according to patient information supplied by Meditronic, a manufacturer of pacemakers, its products protect users from most interference.

Mr Benjamin contacted a number of antistatic materials suppliers. "We asked them if they would come to the car park. Surprisingly they all refused. They said they could sell me an expensive antistatic product that did not work. I realised that we had a big problem."

In order to obtain an independent assessment of the problem Mr Benjamin contacted Dr Smallwood. His report confirmed that in the areas where the decking had been repaired there were extremely high levels of asphalt. "The static charge was being caused by the asphalt", said Mr Benjamin. "The carbon element in tyres rotating on the asphalt or carbon surface was causing the build up of static."

Mr Benjamin said that he discussed a number of options with Dr Smallwood. These included measures to encourage drivers to reduce their speed when leaving the car park. The measures included speed humps at five metres before the ticket barriers. In theory these will slow vehicles so helping to dissipate static in the tyres.

Another solution is to put earthing rods either in the speed humps or in rows. This may mean putting five or six earthing rods very close together. Then the static should dissipate through the rods.

Independent advice is essential. One of the challenges is finding someone familiar with the problem with ample knowledge and experi-

ence of the materials used in them. Chris Whapples is an independent consulting engineer who has considerable experience of designing and refurbishing car parks.

"Anything that is earthed will allow a discharge to happen", said Mr Whapples. "The charge could be on clothing, a car or even the person. It is even possible to get a shock from a screw in a domestic light switch which is earthed. The shock could be of such magnitude to affect your heart. It is such a complex subject. Things can be done to minimise it but you won't get rid of it completely."

Antistatic membranes will only work if they solve the particular problem on an area of decking. Whapples said that all too often clients are taken in by what membrane manufacturers say or they insist on using a particular product because of its cost. "The consulting engineer can see the wider picture", said Whapples "and therefore better results would be obtained if the consulting engineer was given more responsibility and encouraged to work in conjunction with other specialists".

One of the suppliers that Mr Benjamin contacted was Triflex (UK) Limited. Paul Barker, its commercial manager believes that it is the only company which makes a coating that will go over asphalt. "We have had the technology to make antistatic coatings for over 20 years", said Barker. He said that Triflex's solution is called DFS Anti-Static.

"Triflex has been asked by certain long term clients to provide solutions where electrostatic shocks were causing issues for their clientele", explained Barker. "Triflex researched the situation, determined the requirements and the company's research and development team modified an existing conductive Triflex system to suit this particular application. The prime considerations were conductivity of the system, durability, aesthetics and skid resistance."

Barker added: "To date thirteen Triflex DFS Anti-Static pads have been installed on entrance and exit lanes on two separate projects, and Triflex has been asked to look at further projects with similar issues. In all cases, the existing substrate was asphalt. However other substrates and coatings could be overlaid subject to compatibility testing".

The first installation was carried out in 2006 and feedback to date suggests "that Triflex DFS Anti-Static has been successful in eliminating the problems", said Barker. Although this is a small part of Triflex's car park waterproofing, surfacing and protection business, I believe it is important to be able to offer the complete solution package".

Barker would not disclose the product's chemistry. However John Taylor, managing director, USL StructureCare, which also supplies membranes for car parks, said he believes that antistatic membranes use conductive or metallic aggregates to dissipate the charge. He added though that this is a specialist subject and that he is not an expert in the field of antistatic membranes.

The picture is likely to become clearer at the end of this summer and in subsequent years. If more of these membranes are installed and if there are long dry spells sufficient data may become available to assess the effectiveness of these coatings. That may bring some relief to parking managers sweating to cool their brows and trying to keep customers happy. **PN**

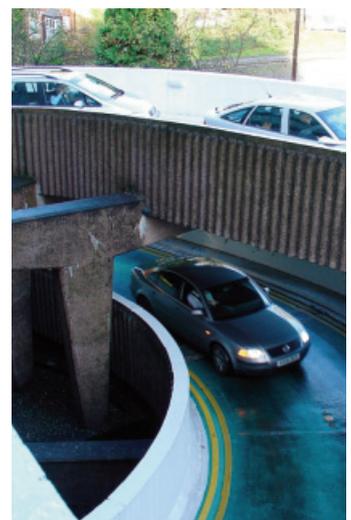
#### **Below**

*Under dry conditions electrostatic charging of vehicles can be greater as the resistance-to ground and surface resistance of the floor, charge and voltage decay times are increased. The result is an increase in shocks experienced by drivers as they lean from their cars to operate the ticket machines*



#### **Below**

*Vehicles rolling on a road surface generate electrostatic charge that can build up to a high voltage on the vehicle*



*Images courtesy of Electrostatic Solutions Technical Brief No. 8: Avoiding electrostatic shocks at car park ticket barriers.*

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