

# The new wonderstuff

At a unique event, a new fire-stopping material – eQuilt – was demonstrated to operators when a double-decker was subjected to an extreme and sustained simulated engine bay fire. The bus survived, and eQuilt proved its revolutionary credentials. Mel Holley reports

It's not every day that routeone is invited to a bus barbeque. But while it's easy to make jokes, the subject is deadly serious. Every year more than 100 coaches and buses suffer engine bay fires and, almost without exception, the vehicle is a total loss. Last year, one of the big groups lost 35 vehicles to fires.

Fortunately, so far (in the UK at least) there have not been any passenger fatalities or serious injuries.

The problem is that once a fire starts, it is very difficult to put out. Fire suppression systems can be fitted, but they add a weight, cost and maintenance penalty. It's also a 'one-shot' device, which may not always extinguish the fire. In contrast, eQuilt, which replaces the existing sound insulation, is a fire-stopping device. It just sits there and does its job for as long as the fire burns.

## Request and response

"Fire does not discriminate against any vehicle, its age or operator," says Gary Hammatt, Sales Director of Clark Wright, which is launching eQuilt to the PCV market.

"If you have not had a vehicle fire, then you are very lucky," he told the Society of Motor Manufacturers and Traders (SMMT) and operator representatives.

As if to illustrate this, in the week before the demonstration, three buses were destroyed by fire. The day before the demonstration, a bus was destroyed by fire on the A1 in West Yorkshire.

The purpose of eQuilt is to stop a fire spreading to the passenger compartment. Once it has done this, the bus is a total loss. Larger groups self-insure, which means they stand all the cost, while independents can face a premium hike.

"You should consider eQuilt as an asset," adds Mr Hammatt. "Its fire-stopping potential will save your vehicles and cash."

The widespread use of mobile phones means there are clips on YouTube that show how quickly fire spreads in real incidents. While there are a number of causes, there have been total losses of buses in the last 12 months that have been brand new, nearly new, or newly refurbished. Age is not a factor.

Part of the problem is increased engine bay temperatures, and higher fuel injection pressures. Other causes include hydraulic pipes fracturing, or turbo failures.

While maintenance can be a factor, often the fire cannot be predicted or prevented. In London, the average response time for the arrival of the first fire appliance is six minutes, and eight minutes for the second. The demonstration significantly exceeded these times.

## Design

Patent pending, eQuilt is designed to be fitted to new or refurbished vehicles – it is attached to the body by self-tapping screws or heat-resistant contact adhesive. Depending on specifications, sound insulation is 1mm or 2mm thick; eQuilt is a little thicker and can be tailored to the application.

It also has extra sound deadening properties. In laboratory tests it reduced noise transmission by 6dB more than conventional sound insulation.

Fitted around the entire engine bay, eQuilt adds around

1.25-1.5% to the cost of a new bus (around £2,000-£2,500). The exact price depends on the quantity used, but the cost of existing sound insulation, which can be up to £1,000, should be deducted.

Additionally, eQuilt will last the life of the vehicle, as it doesn't absorb fluids, so doesn't need to be replaced at refurbishment. Once in place, eQuilt needs no maintenance or other attention.

Based in Northfleet, Kent, Clark Wright Ltd has been created to market the product, a British invention by the firm's Technical Director Will Burton. A career fire consultant, he specialises in designing fire-stopping solutions.

Formal laboratory fire and sound absorption testing of eQuilt has already taken place leading to certification, and the full 25-page report plus data and product information were given to those at the demonstration.

## Burn, baby, burn

The Fire Service College, based at Moreton-in-Marsh, Gloucestershire, was the demonstration venue. It is one of the world's largest operational fire and rescue training facilities, used by UK and overseas fire fighters, with extensive training facilities.

Clark Wright bought a redundant V-reg ALX400 double-decker, taken to the site by London-based Sovereign Recovery, specifically for the test.

The engine and transmission



"No, Mr Jones, I don't think one of your granny's knitted quilts will do..."





Sales Director Gary Hammatt: 'Fire-stopping potential will save your vehicles and cash'



eQuilt looks like conventional sound insulation



The lower deck GRP has bubbled, but is intact



eQuilt expands 25 times during the fire

was removed, and blocks with trays mounted on them put in its place. Into the trays was poured 3.5 litres of diesel, lit with a propane torch. Within one minute, black smoke was exiting the engine bay.

Like the laboratory tests, the bus was fitted with thermocouples, linked to a pyrometer, to constantly measure temperatures. While an engine bay contains combustibles, the diesel fire more than replicated this.

After 15 minutes (by when in real life two fire appliances would have arrived), the fire was at 790°C. In the passenger saloon the temperature had risen to 27°C. Crucially, the

back of the eQuilt (attached to the rising bulkhead) was maintained, as designed, at 200°C. Once this temperature is reached, eQuilt expands to 25 times its volume, enhancing its fire-stopping properties. Significantly, the combustible temperature of wood is 300°C, while aluminium is 650°C.

After 20 minutes, the test ended as the diesel had burned, by when the passenger compartment temperature was 57°C.

Inspection inside revealed that while the GRP at the back of the lower saloon was hot, and some had bubbled slightly, it had not caught fire.

There was very slight smoke ingress, but the seats were not

damaged. Upstairs, while the saloon was a bit smoky, there was no damage.

The consensus of those present was that the vehicle could be economically repaired and returned to service.

To prevent the fire running up

the vertical side internal 'chimneys', which carry heating pipes and wiring looms, a special eQuilt arrangement is used. However, the next generation of Euro 6 'deckers' are reported to no longer have these 'chimneys' that also spread fire. **R1**

**routeone comment**

This was a very arduous test, and despite a few little external licks of flame, the fire was contained. This is a product with potential for many applications in other markets way beyond PCVs, and the fact that Clark Wright is already in discussions with ADL and Wrightbus about fitting it in new vehicles, comes as no surprise.