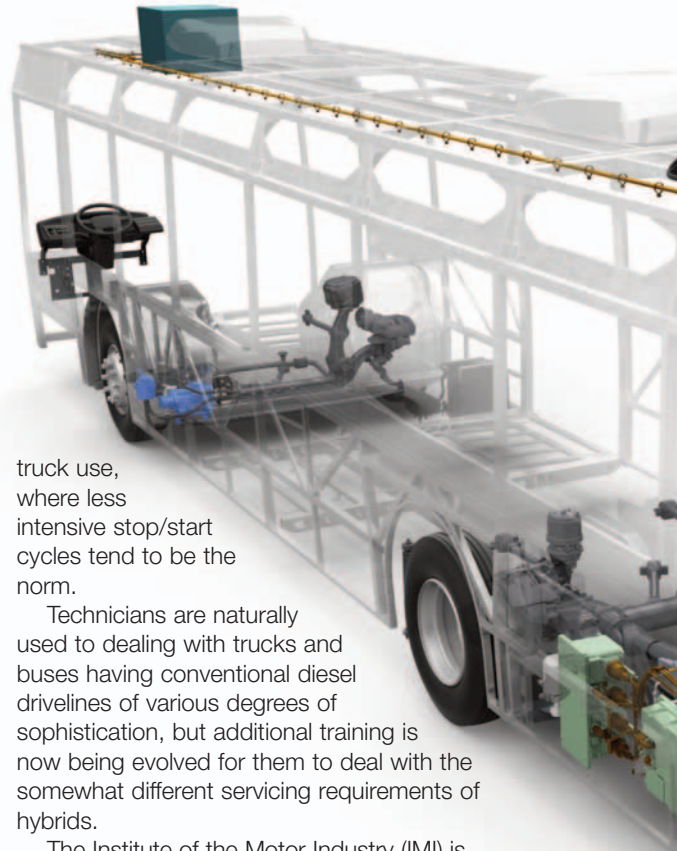


# Hybrids for real

As more hybrid-powered commercial vehicles enter service, John Kendall finds out how technicians are being prepared for some of the different maintenance issues

**T**he need to reduce our dependency on fossil fuels will continue to be a theme for as long as there is still oil in the ground to extract. Among the many ways this reduction can be achieved, where propulsion systems are concerned, is the adoption of hybrid drivelines, which are likely to play an increasingly key part for the foreseeable future.

So far, the commercial vehicle industry has seen several patterns emerge, and many transport engineers now argue that serial hybrids offer the best solution for buses and other vehicles on driving cycles with intense stop and start routes. On the other hand, most manufacturers have adopted the parallel hybrid alternative approach for



truck use, where less intensive stop/start cycles tend to be the norm.

Technicians are naturally used to dealing with trucks and buses having conventional diesel drivelines of various degrees of sophistication, but additional training is now being evolved for them to deal with the somewhat different servicing requirements of hybrids.

The Institute of the Motor Industry (IMI) is developing 'national occupational standards', from which technician and employer training programmes for working with hybrid propulsion systems will be devised. As hybrid drivelines manufacturer BAE Systems and others point out, these guidelines will define the knowledge and skills essential for working with, and on, electric and hybrid vehicles alike.

There are relatively few hybrid trucks on trial or

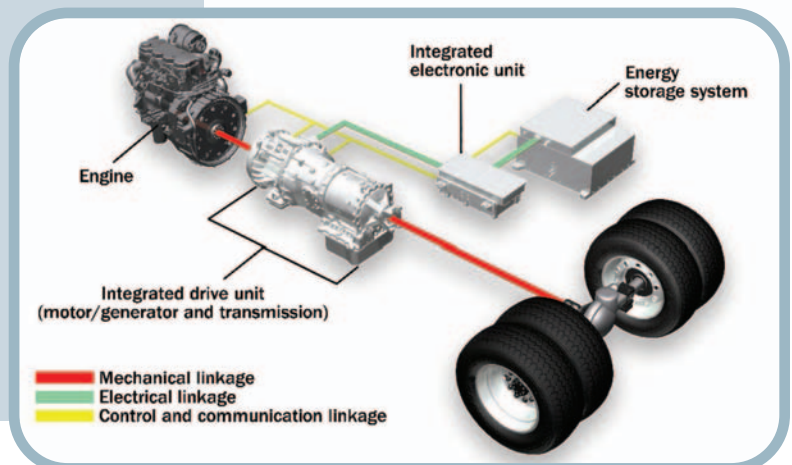
## Hybrid manufacturer's training

To gain a better understanding of what might be required, in terms of technician training for hybrids, it is worth looking at BAE Systems' own procedures. The company, which manufactures hybrid systems under the HybriDrive brand through its Platforms Solutions Division, has been building hybrid drivelines for some time and has developed training programmes for over a decade.

BAE Systems' engineers and field service representatives involved with the HybriDrive system are given high voltage and high power awareness training, along with formal familiarisation for the system. This training is also given to the vehicle manufacturer using the system, and to the operator's personnel, to make all of them aware of the safety practices required.

In devising the training, the company takes into account the different skill levels required for servicing, repairing and testing the system. For example, its engineers and service representatives involved in system repairs are given additional on-the-job training and mentoring to ensure that they develop the skills and safety practices necessary to repair and test the driveline.

Each individual also undergoes an annual assessment to ensure they continue to operate safely and in accordance with latest regulations. Beyond that, hazard awareness is provided to first aiders to ensure they recognise the dangers associated with high voltages and battery systems.



on the road at present. Those that are tend to be under the care of the manufacturers' centralised technical teams, so perhaps it's not surprising that few of the companies contacted had much to say.

Volvo Trucks proved the exception, probably because it also has considerable experience of hybrid buses to draw on from its bus division. Legislation and environment manager Ray Cattley explains that Volvo has devised its own training programme for dealers that are near to the depots



where hybrid vehicle are based. "This training is being rolled out progressively as hybrids are being sent to new areas of the country and this will also be supported by centrally trained product quality engineers," he asserts.

The company's experience with hybrid buses had a major impact on how Volvo manages training, according to Cattley. "By managing training in line with the introduction of hybrid buses, we have been able to develop a centre of excellence to support our field test group of eight hybrid trucks and buses, serviced and supported through our dealership at Enfield," he says.

Cattley says he can also see an opportunity, through the engineering work that hybrids will generate, to attract new blood into the industry. That, he believes, could prove to be a useful lever for an industry that has not found it easy to attract new technicians in recent years.

"[Hybrids] will be interesting to new apprentices with a slant for new technology and one area where the government could actually provide some

assistance to support the new training initiatives needed," he says. "So far, despite various grants for passenger vehicles, cars and buses, there has been nothing at all for hybrid trucks."

### Money well spent?

Whether additional funding will be made available for hybrid trucks in the current economic climate must remain doubtful. However, the Green Bus Fund has certainly helped to stimulate demand for hybrid buses – and, indirectly, the training infrastructure that underpins it – through the £40m made available in 2009 and 2010.

It was part of the motivation for Transport for London (TfL), for example, to plan the replacement of all existing buses with hybrid models. While the original scheme was to introduce an all-hybrid fleet for London by 2012, the revised approach will see 300 hybrid buses introduced by 2012, building up the number of hybrid buses in the following years.

Alexander Dennis (ADL) has been running two hybrid programmes, delivering parallel hybrid vehicles for North America and serial hybrids for Europe. The firm uses the hybrid driveline developed by BAE Systems for its European buses and BAE has been intimately involved in its technician training programme.

"We do try to make the introduction of hybrids as smooth as possible for operators," explains Andy Boulton, ADL's technical sales manager. "We work closely with the depot's engineering team to introduce them to the hybrid technology. First, visits are arranged to see hybrid chassis on the production line and also to see the BAE Systems site in Rochester, from where the hybrid driveline is supported. A completed vehicle is always inspected at the plant in Falkirk before despatch to the customer. Then, when buses are delivered to the operator's base, high voltage awareness training is delivered."

Boulton insists that there is limited risk to maintenance staff from hybrid technology. "There is limited intervention that a depot technician will be involved with and, as the battery pack has a five-year warranty, it is not expected that they will need to be exposed to high voltage. Any high voltage cabling is also enclosed in an orange sleeve, so harnesses may be easily identified."

The rest of the vehicle can, reveals Boulton, be isolated from the high voltage circuit by turning off a rotary switch under the bonnet – thereby effectively turning it back into a 24-volt bus. "This can then be locked in position to allow safe work on the vehicle, without fear of the high voltage being restored," he explains. **TE**



Hybrids buses have become a familiar site on the streets of London