

# Main course

The increasing sophistication of vehicle diagnostics has seen a new breed of technicians emerge who require the combined skills of electricians and mechanics.

John Challen discovers how training courses are adapting to keep up with the challenges

In the 26 years that Mark Oliver has worked at Scania, plenty of working practices have changed, not least in the area of technician training. The truck manufacturer's technical services manager states that the courses have had to alter dramatically, but these developments have resulted in better prepared workers, with greater and wider ranging skills than before.

"Historically, you had a technician that dealt with mechanical items, as well as an electrician for the electrics," he recalls. "Now you try to put the two together, because you can't do one job without the other. We try to upskill all our technicians and provide them with at least a basic electronic understanding, so that they can carry out vehicle diagnosis more successfully."

Oliver says much that Scania does is about a logical approach to working out and diagnosing problems. "Nowadays, technicians have to realign the practical experience they have with the work that they do on a laptop," he explains. "We say to them that knowledge is the eyes and ears inside the ECU, but you still have to gain the basic understanding. That way, we ensure that they know how the mechanical components influence a situation that the laptop can't see."

Scania training is based around two clear areas: Scania Network Training, for all of the company's technicians, and then customer courses. "In the network training, every course has an electronic element," explains Oliver. "Where historically you had purely mechanical courses related to, say, the engine or gearbox, we now always pay attention to electronics as well."

A similar setup is provided for the customer



courses, which are open to those involved in truck, as well as bus and coach, operations. "On a typical programme, such as the fuel system course, participants will start with injectors, and the basic settings and mechanical workings of the system," explains Oliver. "Then we will look at the electronic controls and then there will be practical exercises, with technicians looking at and measuring signals, where faults are intentionally put on vehicles."

Oliver says that Scania's helpdesk, located on-site, also proves a useful addition. "The helpdesk allows us to share experiences easily. We get to know about regular issues and we can input that



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**Mark Oliver**

data into our training course so that, wherever possible, we can recreate that problem and help the technicians find the most effective and quickest way of finding, and then diagnosing, the fault.”

Technicians will typically see a series of faults on a vehicle and work their way through problems – some mechanical and some electronic – looking at the laptop and using the fault codes displayed on the dashboard to diagnose the faults.

Oliver insists that those participating are not allowed to get ahead of themselves or lose sight of the basics. “We put a heavy emphasis on everyone on all our courses, even the electrical and electronic programmes, to remember the basic [engineering] principles,” he explains. “We don’t want people to forget that you’re still working with mechanical components, containing pistons and valves, for example. Sometimes, people forget that.”

Oliver tells tales of helpdesk operators taking calls from customers and dealers thinking they have electrical problems, because they see a series of cables disappearing into an ECU (electronic control unit). “People think ECUs are as fragile as they were 15 years ago,” he observes. “An ECU might well assume that the mechanical setting of an injector,

for example, is correct, so it might throw up an electric fault code, if it is not. Before they go down the route of changing parts of wiring looms and harnesses, the problem could actually be something as simple as an injector’s mechanical properties.”

So, if you’re looking for technicians with a specialised electronics background, think again, warns Oliver. “We’ve had electricians on our courses who have struggled more than technicians, because they don’t have the mechanical understanding,” he states. “They might be good at diagnosing electric faults, but, once you get inside the engine and you are looking at the

cylinder balance, for example, if the signals are there on the laptop, that is the end of their task. However, you still need to confirm that what they are seeing is correct – and this is where the additional mechanical know-how is so important.”

#### **Devil in the detail**

Meanwhile, in response to the ever more sophisticated systems found on vans, trucks, buses and coaches, many training providers have expanded the number of courses they offer. One of the latest to add learning opportunities is Warwick Control, with its ‘CAN Bus and LIN Bus fault finding for technicians’ event.

This one-day training course is aimed at technicians that require information on dealing with the CAN (controller area network) and LIN (local interconnect network) buses. On completion of the course, candidates will be armed with information that will, according to the company, “help troubleshoot and repair CAN and LIN-based vehicles”.

Already offering training in LIN (standalone), FlexRay and in-vehicle networking, Warwick Control believes its new programme will be more representative of real-life situations, focusing directly on fault-finding techniques for both networks.

After covering the basics of CAN and LIN in the morning, the afternoon is predominantly practical, in a lab environment, which allows technicians to put their newly acquired knowledge to use. Scopes, hand-held DTC readers and PC-based analyser tools are all used to help improve skills levels.

Some of the many topics covered include: the evolution of ECU integration; understanding the electrical signals; understanding bit rates; CAN failures and fault finding; CAN signal data formats; LIN message types and schedules; and diagnostic trouble codes (U-Codes) versus realtime network data. **TE**

**Technician training continues to take on an increasing amount of diagnostic elements at Scania**

