

The key to success is **knowledge**

Any repair requires an understanding of what is wrong, and the effects of what you are doing. Both require an understanding of how things really work. eXponentia's Steve Carter explains the importance of knowledge as it applies to the ever increasingly complex world of the motor trade.



Steve Carter, eXponentia

As a lecturer for eXponentia, I visit numerous colleges, universities and training centres to deliver courses, and quite often a lecturer from this venue will sit in on a course for their continuous personal development (CPD). Often they are stunned by the rapid development in automotive technology, but go on then to tell me that many of their colleagues still perceive this subject to be undertaken by students with poor academic qualifications, but that are good with their hands. This never ceases to amaze me, as we try to understand the complexities of vehicle networking systems such as VAN, CAN bus and Flex Ray. Being good with your hands is not going to help you too much here.

Let's take this example: **2008 Volkswagen Golf 1.6 SFi**, like all VW models of this age, was fitted with a Teves MK 60 ABS/ESP system and it suffered from a common fault - a brake pressure sensor failure. It was also suffering from a steering angle sensor failure, a garage duly replaced both defective sensors. The brake pressure sensor problem had cleared, but the steering angle fault remained. Given the high cost of the steering assembly, and no ability to test it off the vehicle, the garage decided to give me a call.

Arriving at the workshop, the owner duly showed me the two fault codes in the engine management and ABS/ESP units. The component itself is located at the top of the steering column switchgear assembly, and was accessible only by removing the airbag, clock spring and steering wheel.

Now, if you understand CAN bus, you know that the engine management and ABS/ESP control units don't see this sensor directly, they are being informed of the sensor's functionality by the switchgear. This is a small control unit located under the bottom of the steering column by the steering wheel, which the airbag, steering angle sensor, cruise control and other components plug directly into. Therefore, to diagnosis this fault correctly, you should interrogate this control unit first, not the engine management and ABS/ESP control units. When the switchgear control unit was interrogated, it informed me that the sensor was missing. It wasn't, of course, which told me

straightaway that the fault was in this control unit and not the sensor. The switchgear module was more like a printed circuit board, and when flexed, it could miraculously see the sensor. The defective module was replaced and the steering angle sensor was recalibrated, a rather lengthy, but necessary, procedure. The car then drove with no warning lights.

So back to my opening statement, the need for the modern motor technician to understand ever more complex systems will continue to increase, and only by staying up-to-date will the technician be able maintain these types of vehicles.

Another example of the importance of understanding how a component or system works when you are diagnosing a problem, was a seat belt on a **2008 Honda Accord** that had a locked spool. The driver's seat belt had retracted into the pillar and would not come out again. The anchor was removed in hopes that with a little more slack, the seat belt would release again. No matter how much slack was given, the spool took the belt in and would not release it.

The next step was to remove the take-up reel, to see if some foreign object has become lodged in the mechanism to prevent it from operating properly. Nothing was found. There were no foreign objects, all parts were in place and were not worn, and yet the reel would not release.

Now I love a good puzzle, but all puzzles require an answer. By removing each separate part of the take-up reel, the fault was narrowed down to the inertial latch mechanism. This is the part that latches the reel into position under heavy braking, or on some models when you pull the belt out rapidly. The latch that extends out to engage teeth to lock the reel in position would not retract, permanently locking the reel. After removing the cover on this part, the fault was easy to see, but difficult to believe. The spring that kept the latch free from the teeth had popped off the latch, allowing gravity to drop the latch onto the teeth. Just how the spring could have become unseated is not clear, but it was a clear understanding of how the seat belt worked

that lead to a quick diagnosis of the true fault.

Knowing the function of the components and the system you are working on is critical. Given that the manufacturers keep developing new ideas that end up in your garage, continual training is a mechanic's only hope of staying ahead of the game.



A spring, at top, was unseated, preventing the seat belt reel from releasing the belt



The spring in its proper position

