

AUTOMOTIVE TECHNICIAN TRAINING

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Next ATT free update

And it will include automotive key skills for free as well! The updated DVD will be issued to all centres in the new academic year or sooner if we get it finished in time. Also included will be new structure options for accessing exactly what you need for IMI and C&G awards at all levels.

Once again due to the feedback supplied by those of you working at the 'sharp end', ATT just keeps getting better and better—thank you.

Saab BioPower hybrid concept

Packing formidable pulling power from its 260 bhp (191 kW) 2.0-litre turbo BioPower engine and 53 kW electric motors, the BioPower Hybrid Concept in the Saab 9-3 range of cars can briefly generate torque values three times greater than its petrol-only equivalent. It is a sporty combination that makes for improved performance, as you would expect from Saab, as well as greater fuel economy and an extended driving range.

Saab's modular hybrid system features a maintenance-free, 300-volt battery bank designed to last the lifetime of the vehicle, a 38 kW rear-mounted electric motor, a 15 kW integrated starter generator and all-wheel-drive with electric power transmission to the rear wheels. The entire system has been packaged without sacrificing cabin accommodation or trunk space, as demonstrated by its unveiling in the Saab 9-3 Convertible.

The all-aluminum 2.0-litre BioPower engine is modified to run on pure E100 bio-ethanol fuel, giving zero fossil CO₂ exhaust emissions, and operates in tandem with the electrical power system. This offers fuel-saving stop/start functionality, torque boosting electric power assistance on demand, an electric-only 'Zero Mode' for city driving and regenerative braking.

The Saab 9-5 2.0t BioPower is already an outstanding sales success in Sweden, where it is currently the best selling environmentally-friendly vehicle on the market and able to exploit a fast-developing network of filling stations selling E85 (85% bioethanol/15% petrol) fuel.

The Saab BioPower Hybrid Concept now goes a step further by using an engine fuelled by pure E100 bio-ethanol. This is a BioPower evolution of the current all-aluminium, 16-valve 2.0-litre turbo engine in the Saab 9-3 range. It



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World's first fossil-free hybrid vehicle (cont.)

“Electric energy storage is provided by a 42-cell, 300-volt lithium-ion battery...”

now develops 260 bhp and an impressive 375 Nm maximum torque, 24 per cent and 25 per cent more respectively than on petrol. The engine incorporates an integrated starter generator (ISG) and also charges a 300-volt battery bank, mounted under the floor of the trunk.

The Saab BioPower Hybrid Concept retains a flex-fuel capability and features a Spark Ignited Direct Injection (SIDI) system for optimum

Hybrid Concept's fuel-saving, stop/start functionality. It serves a multi-functional role as a starter motor, alternator and 15 kW engine power booster, while also helping to iron out residual crankshaft vibrations.

The five-speed automatic transmission, with Saab Sentronic sequential selection, includes an all-wheel-drive capability by the simultaneous addition of electrically powered drive to the rear wheels.

A parallel hybrid system has been adopted, where the control strategy is based on efficient 'energy management' - recovering, storing and feeding back energy that is otherwise lost in a vehicle powered only by an internal combustion engine. The engineering team have utilised General Motors'

hybrid experience in the development of stop/start engine functionality, electric rear-wheel drive systems and regenerative braking. Apart from converters to manage AC/DC and 12,42 and 300-volt interfaces, the system consists of just three core components: two electric motors and a battery bank.

Electric energy storage is provided by a 42-cell, 300-volt lithium-ion battery

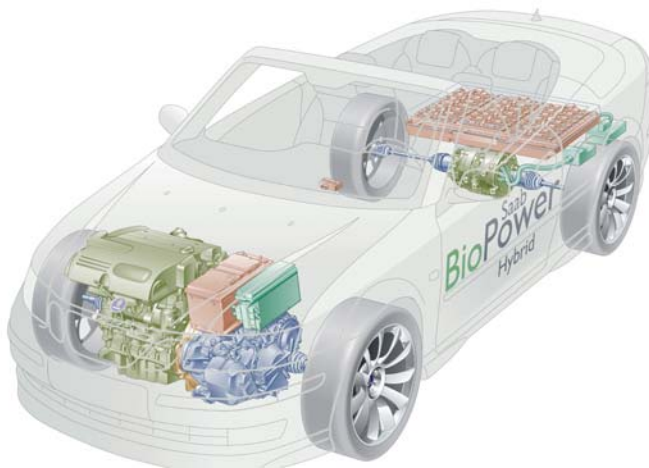
bank, designed to be entirely maintenance-free throughout the lifetime of the vehicle. Its performance is carefully monitored and governed by an electronic control unit, through which electric current from the engine is fed.

The battery supplies a compact 38 kW electric motor located between the rear wheels which powers a transmission differential and drive shafts. At low speeds, this Rear Drive Unit (RDU) is able to briefly generate 666 Nm of additional torque.

In reverse operation, the motor acts as a generator to provide 'regenerative braking'. It automatically recovers kinetic energy otherwise lost during braking and converts this into additional battery charging. It also performs the same function whenever the driver lifts off the throttle, harnessing the energy in the rotating drive shafts. This is achieved without any perceptible change in the rate of deceleration.

The second electric motor is the integrated starter generator (ISG) located within the flywheel between the engine and main transmission. On demand, it contributes 15 kW of additional power and 120 Nm of extra torque to the output of the engine through the front wheels.

(Source: Saab Media)



Saab BioPower system
(Source: Saab Media)

combustion with E100; ensuring the same cold starting performance as a normal petrol engine. Variable inlet and exhaust cam phasing is used for optimum breathing and more durable valves and valve seats are fitted, together with bio-ethanol-compatible materials for the fuel system.

The compact 42-Volt ISG, built into the flywheel between the engine and transmission, is the power behind the Saab BioPower

Learning a thing or two in Malaysia



I recently visited an automotive college in Kuala Lumpur, Malaysia and was so impressed that I wanted to share my experience. I had been invited in my capacity as a famous international author – cool eh!

'The Otomotif College' (TOC) in Petaling Jaya near Kuala Lumpur, run many courses for all types of students. They have links with many manufacturers but in particular Proton of course. The largest group however is the school leavers, just like here in the UK; aged mostly from 17 to 20.

Looked after by the general manager, William Low (and many others), I was able to see and discuss many aspects of the training that the students experience. I was particularly struck by the commitment and enthusiasm of the staff that I met. The high expectations of standards of work and behaviour by the students was particularly noticeable.

TOC have a mission statement on a board in the reception area that goes something like:

"...to produce high quality students and improve the image of the automotive service and repair industry..."

They are certainly doing that.

On a jet-lagged Saturday morning at 08.30 I was fortunate to be able to attend (as the VIP guest!) a practice for a national 'benchmarking of skills' competition. Many colleges enter this competition in the hope of winning the national title. Two students had been chosen from TOC, aged 19 and 20, to represent the college – they had both been at the college for about one year only. The task they had to complete in under three hours was, broadly speaking, to disassemble a modern four-cylinder Proton engine, measure and assess the condition of the components and then, of course, put it all back together. The DOHC

engines were fully fitted with all the auxiliary equipment.

The two students, Nor Azfar Haniff and Justin Davy Lee, were set to work in front of a panel of six Judges (Jake, Peter, Joel, Jared, Ferman and Allen) – and about 60 or 70 of their fellow students who had turned out to support them. The supporting students, all wearing their college T-shirts, were no different from many of our own here in the UK when they first arrived at the college.

The staff watching ranged from teachers, administrative staff and managers (Maji and Sharifah to name just two), to the senior managers and the CEO (Adelaine Foo). And then there was me – sweating in the 32 degrees plus temperature and tropical humidity – because the air conditioning had been turned off to more closely simulate the conditions for the actual competition the following week! Remembering that this

"...to improve the image of our industry should be something we all want to achieve."



Haniff (top) and Justin (above) hard at work

Blended Learning Solutions

Digital University Press
Whitegates Business Centre
Alexander Lane
Shenfield
Essex CM15 8QF UK

Phone: +44 (0)1277 219119
Fax: +44 (0)1277 219120
Email: info@digitalup.co.uk



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...Malaysia (cont.)

was a Saturday morning, which made me think about the commitment of many UK students that I know...

Watching the competition from the top table I was very impressed with the way the students worked. They moved quickly and efficiently but did not rush. Tools and equipment (no air tools were allowed by the way) were handled with skill and care as they both carried out their work. With over one hundred people watching their every move and some of us generally getting in their way by taking pictures, the removed parts were all laid out neatly and carefully.

On reassembly, proper torque settings and manufacturers' procedures were used at all times – no short cuts allowed. Their work was excellent and at the end the judges (once they had figured out how to work the score sheets!) could only separate them by two points – who won in that respect was irrelevant as both would have achieved gold medals in the competition proper.

The managers staff, teachers and students should be proud of what they are achieving at TOC. It was my privilege to present Haniff and Justin with their prizes as well as several other raffle prizes – one of which I even won myself!

I will be pleased to continue my association with this college – and I wonder if we could all learn a thing or two from them about expectations in general. In particular, the wish to improve the image of our industry should be something we strive to achieve – no matter what students seem like when we first meet them.

Finally, perhaps we should all be more proud to describe ourselves as Automotive Technicians.

Tom Denton, Kuala Lumpur, 17th June 2006.

As the leading provider of automotive training blended learning systems in the UK and USA, Digital University Press (DUP) specialise in the creation of electronic training materials for the automotive education sector and automotive industry.

Working with world class automotive companies DUP has a substantial training resource that comprises over 7000 screens of learning coupled with a 1500 page workbook, 10,000 image database, 300 worksheets, and 1,500 randomly generated multiple-choice questions. Having control over this intellectual property allows DUP to bespoke and re-brand but, most importantly, respond to clients in a timely and cost effective way.

Alan Church is the managing director of DUP with the team being led by Tom Denton the UK best selling automotive author.

