

# AUTOMOTIVE TECHNICIAN TRAINING

DIGITAL UNIVERSITY PRESS

In association with:

**BOSCH**



**Snap-on®**

## Does this mean more work?

Just what we need eh! More changes.

However, don't worry if you are an ATT user because long before the new standards are in use (September 2005 all being well), you will receive our biggest update yet.

During the spring term 2005 we will be issuing a huge update that not only has more features (as requested by our users) but the update will also include an interface menu and material to match the new awards.

Also included will be assignments for self study and even more multiple-choice questions.

Please continue to give us your valuable feedback it is appreciated and we do act on it wherever possible. ATT is now in use in over one hundred centres across England, Wales, Scotland and Northern Ireland.

Thank you to all our users we appreciate your business.

*Tom Deaton*

## Special points of interest:

- **Free training**
- **Three-valve cylinders**
- **Variable valve timing**
- **Variable displacement engine**

## Training sessions

Just a reminder that DUP are offering free training sessions to each college or training company. Several sessions have already been run and were all well received by the delegates.

However, if traveling to our offices in Essex is difficult,

sessions can be run at your premises at very reasonable rates.

Please email or telephone if you would like to discuss this.

## Inside this issue:

VVT	2
VDE	3
Other products	4
Contact details	4

## POWERTRAIN TECHNOLOGY HIGHLIGHTS



Three valve engine (Source: Ford Media)

*“The use of a three-valve cylinder head improves power while delivering improved fuel economy”*

New technologies, which will be seen (or are now used) in Ford Motor Company engines in the near future, represent important steps toward achieving the company's ambitious fuel economy goals without sacrificing customer-driven performance attributes:

### **Three-Valve Cylinder Head**

The use of a three-valve cylinder head improves power while delivering improved fuel economy. Ford Motor Company's cylinder head design accomplishes these two customer demands without requiring them to purchase more expensive high octane fuel, which is customary with other multiple valve designs. Ford's three-valve design - two intake valves and one exhaust - employs a low-friction valve train, accomplished through the use of roller finger camshaft followers and a

spark plug mounted in the centre of the cylinder head.

On Ford Motor Company's new three-valve design, the spark plug is mounted directly over the piston, rather than the more traditional side position, a change that offered greater combustion efficiency, but required innovative engineering, as valve train components reside in this small area as well.

With this new spark plug location, Ford Motor Company is able to increase the compression ratio on its engines without requiring higher octane fuel. In general, higher-compression engines deliver better fuel economy and performance.

### **Variable Valve Timing**

The use of a variable valvetrain provides fuel

gains by reducing pumping losses, the work required to pull air in and push exhaust out of a cylinder. It also improves emissions. Ford Motor Company engineers have seen fuel economy improvements as large as 8 percent on certain test cycles, with improved power output over a broader engine speed range and fewer hydrocarbon emissions, particularly at cold start.

While there are multiple approaches to variable valve timing (VVT), Ford Motor Company already uses what is known as exhaust phasing on the 1.8-litre engine used in the Puma. In contrast, intake camshaft phasing, the most typical method found on many of today's production engines, typically advances or retards the camshaft by varying oil pressure in a unit called a cam phaser



Variable cam timing (Source: Ford Media)

positioned between the camshaft and cam drive system.

Ford Motor Company is experimenting with a patented new technology called camshaft switching, which uses a solenoid-controlled roller finger that follows the camshaft lobe. Depending on engine load, this electric switch can open the valve further for increased acceleration power or can operate it in the 'low' setting for normal driving, where reduced flow generates better fuel economy and fewer emissions.

### Variable Displacement Engine (VDE)

What if you could have the power of a V8 engine that delivered fuel savings more akin to a four-cylinder engine? Better yet, how about a V10 that would run on just five cylinders when all that extra power wasn't needed - and deliver fuel economy improvements between 8 and 11 percent? Today's advanced powertrain controls open the door for Ford to provide its customers the performance of a V8 engine, with some of the fuel economy benefits of a smaller engine.

This switching on and off of cylinders is known as

variable displacement engine (VDE) technology. While the idea of VDE is not new, Ford Motor Company is considering it as a feature for the everyday consumer, not just as a niche market experiment. Ford is now able to mass-produce variable displacement engines due to availability of new, more powerful control modules.

In a V8 VDE installation, used in the USA, the engine can run on four or eight cylinders, switching back and forth as needed, depending on driving conditions. The work of determining which cylinders aren't necessary is handled by a microprocessor that controls the opening and closing of selected intake and exhaust valves. With the valves closed, piston movement continues, but there is no mechanical work lost because the air in the cylinder is simply compressing and expanding.

Engine displacement quickly grows back to eight cylinders as soon as the driver steps on the accelerator, as in an overtaking situation. VDE systems used in some cars in the 1980s were noisy when operating on four cylinders and weren't able to make a seamless transition to

eight-cylinder operation because the on-board computers of the day had small memories and were unable to perform more than about 200 calculations per second. Today's on-board computers can perform 2,000 functions per second, offering far smoother operation.

*“What if you could have the power of a V-8 engine that delivered fuel savings more akin to a four-cylinder engine?”*



Three valve system (Source: Ford Media)

## 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](mailto:info@digitalup.co.uk)



WE ARE ON THE WEB:  
[WWW.DIGITALUP.CO.UK](http://WWW.DIGITALUP.CO.UK)

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 be bespoke and re-brand but, most importantly, respond to clients in a timely and cost effective way.

DUP is owned principally by Mark Pitman of Pitman Publishing, Pitman Training and Bath Press. Alan Church is the managing director of DUP with the team being led by Tom Denton the UK best selling automotive author.

## Other DUP products

Do you have colleagues in other departments who would benefit, as you do, from multimedia training material?

We have a great product available in Food Preparation and Cookery—get them to call us for a free demo. Also available now, is what everybody has been waiting for: Vocationally specific Key Skills. The areas covered are:

1. Automotive (of course)
2. Hairdressing
3. Beauty
4. Food Preparation
5. Travel and Tourism
6. Care
7. Business
8. Engineering
9. Construction
10. Generic



Hope he is using the correct grade of oil!

Please call John Oxlade on: 01277 219119, or email: [info@digitalup.co.uk](mailto:info@digitalup.co.uk) for more details...

**Automotive Technician Training**

A decorative graphic at the bottom of the page featuring two checkered racing flags on poles, positioned between two sets of horizontal lines that curve upwards at the ends.