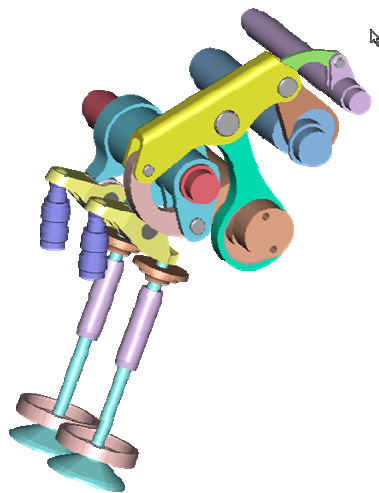**PTL** POWERTRAIN TECHNOLOGY

OSCAM Valvetrain

A Combustion and Emissions Development Tool

- Do you need to define the optimum valve event profile and timing for your production engine?

- Do you need to define the optimum high lift-low lift combination for the 2-step VVA system on your engine?

- Are you working to define optimum engine performance by advanced engine valve control?

- Are you working in the area of novel combustion strategies?

- Do you need a valve opening system that can continuously and independently vary the lift and opening period of you engine intake and exhaust valves?

- Would you like the system to be robust, easy to control and easy to move from one engine to another?

Then take a look at the specifications of the OSCAM system.

Introduction

OSCAM is a fully variable mechanical Variable Valve Actuation (VVA) system with the unique advantage of providing full and independent control of valve opening period and peak lift.

Figure 1 shows some examples of achievable valve events, whereas Figure 2 shows the possible lift-period combination achievable by a typical OSCAM embodiment for gasoline engines.
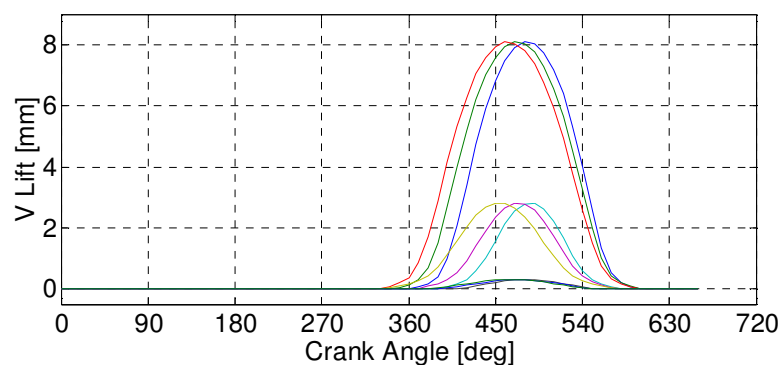
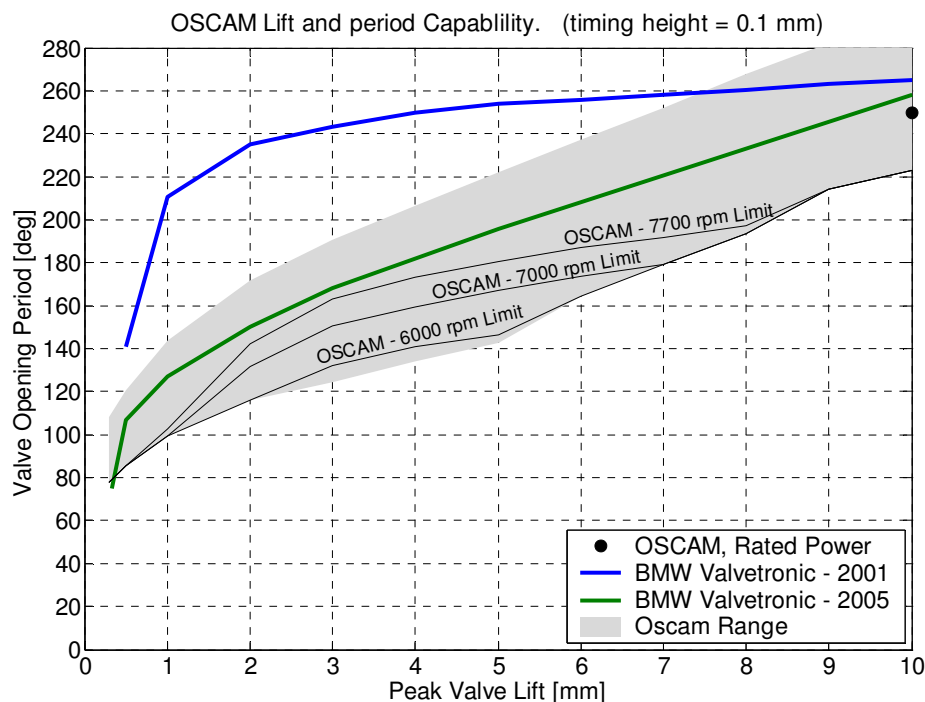Figure 1: OSCAM examples of achievable valve events

Figure 2: OSCAM typical lift-period variability range

PTL POWERTRAIN TECHNOLOGY

Key Characteristics

- Mechanical system, easy to understand, setup, commission, operate and maintain. Allows concentrating on the task in hand without worrying about valve actuation

- Possibility of complete lift and period control for each cylinder valve

- Manual or electronic close-loop control of valve lift and period

- No need for large external power source, apart from mechanical drive from the engine and 12V battery

- Allows studying the effect of the valve operation on engine breathing, combustion and emissions without the need to design and procure several different camshafts, but still use valve events which are achievable by conventional valvetrain mechanisms (no step or square valve events)

- It often packages on top of production cylinder heads, therefore allowing to be moved onto different stock engines with no modifications to production hardware

- Available in various embodiments for:

  ✓   Inclined valves (gasoline engines)

  ✓   Vertical valves (diesel engines)

  ✓   Single or cylinder research engines

  ✓   Intake or exhaust only

  ✓   Multi cylinder research or stock engines
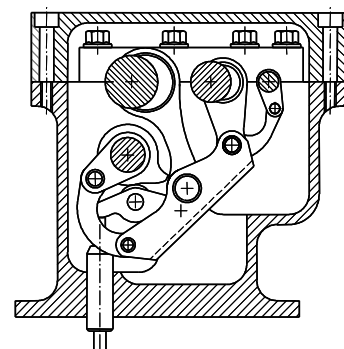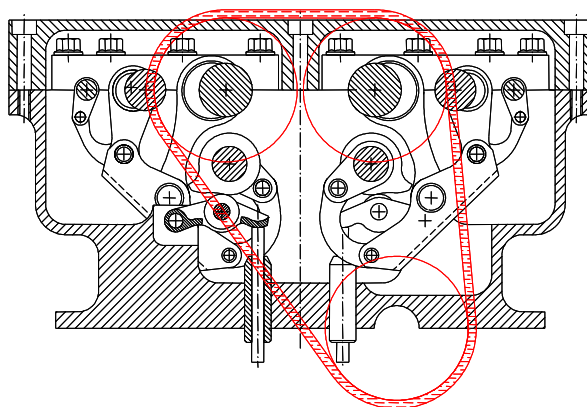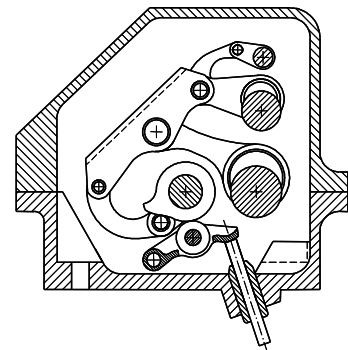
Functional Specifications

Specifications can be varied to customer requirements. The table below shows the standard OSCAM specifications:

Parameter	Specification
No. of cylinders	1 - 6
No. OSCAM actuated valves per cylinder	2 – 4
No. independent valves per cylinder	1 – 2 – 4
Total period-lift Degrees of freedom (DOF)	2 – 4 – 8
Max lift	10 -11 mm
Lift-period variability required	To suite periods (see Figure 2)
Lift-period control	By electrical close-loop position control of actuation shafts
System response	0.5 sec max, range extremes
Minimum period increments	1 - 2 crank degrees (Lift dependent)
Minimum Lift increments	0.10 - 0.30 mm (Period dependent)
Oil pressure	2 bar min
Oil temperature range	0 -120 degC
Engine speed	0 - 6500 rpm
Cylinder pressure at exhaust valve opening	< 6 bar
Drive position	Engine front or back
Driving direction	Clockwise
Cylinder distance	Application dependent
Valve spacing	Application dependent
Cam phasing	By using std cam phasers
Valve event sensors	Peak lift and period
Service interval	> 250 testbed hours
FMEP	Expected to be < twice std valvetrain

Applications

The system enables investigating the effect of valve events on:

- ✓ Cylinder air motion
- ✓ Pumping losses
- ✓ Fuel mixing
- ✓ Combustion
- ✓ Emissions

and it is intended to be useful to:

- ✓ OEMs
- ✓ Suppliers
- ✓ Universities and other research institutes

How to Contact Us

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