

**FORMULA 3
ENGINE
2002**

Project Update

SWINDON-FORD

ISSUE 2

Contact Details

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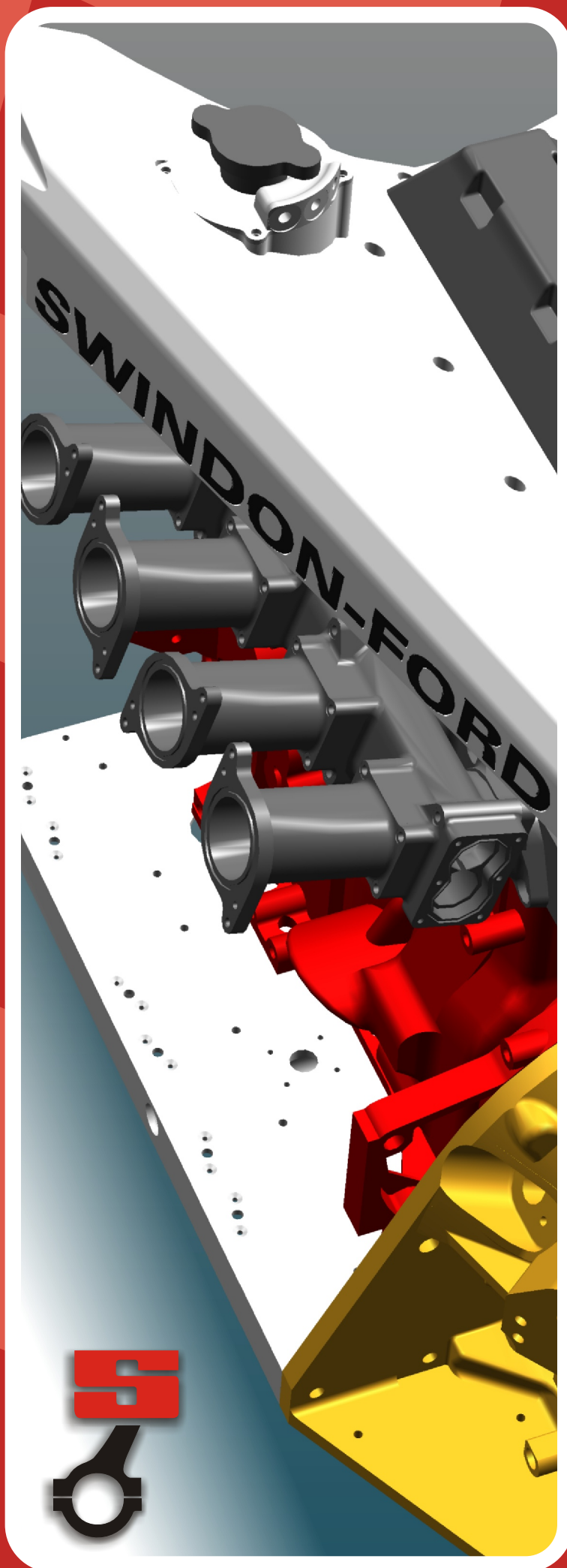
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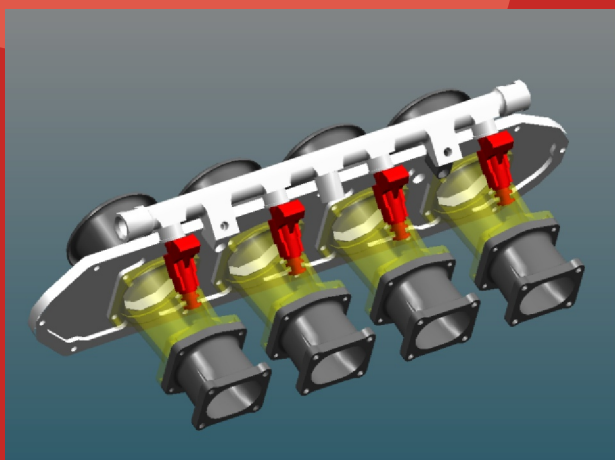
Project Update Issue 2



Purchasing our own 2001 specification chassis has helped with engine installation.



Build of our five track development engines has begun



A development intake system

FORMULA 3 ENGINE 2002

Issue 2

SWINDON-FORD

Swindon Racing Engines are developing a Ford based Formula 3 engine for a full assault on the 2002 Formula 3 championships.

Recent developments include the purchase of a Dallara Formula 3 car in 2001 specification enabling us to finalise the installation package. Testing will commence with our own car during September helping us complete mapping work and enhance driveability.

Recent investment has seen the acquisition of two 7 axis CNC machines and a mobile workshop for track side support.

This issue is the second in a series regarding the Swindon-Ford Formula 3 engine package. If you missed issue 1, you will find it at the back of this issue. If you have any queries or require a visit to Swindon Racing Engines, please do not hesitate to contact Andy Pycock.

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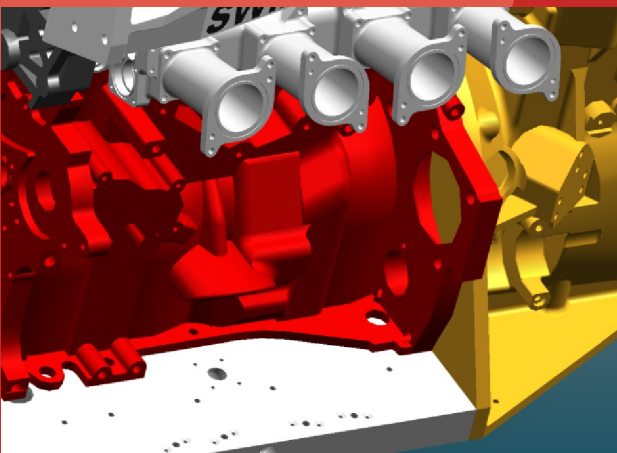
Engine Installation



The engine, installation kits and car engine cover have been fully 3D modeled.



The installation kit has been designed working closely with Dallara.



The wide sump is met by the redesigned bell housing, ensuring strength and weight are positioned correctly in the engine installation kit.

Key areas of the fully integrated installation kit include:

The cam cover acts as an important structural component to the whole engine package. Its heavy duty yet light weight design mounts directly to the back of the chassis.

As well as mounting to the chassis, the cam cover also joins to a redesigned bell housing at the rear of the cylinder block. This combination of mounting points ensures the engine installation is very much a structural part of the chassis.

The sump also works as a structural component, its wide design mounts directly to the chassis and bell housing greatly improving its torsional stiffness. Again the redesigned bell housing helps to achieve rigidity by stretching to the width of the sump.

The chassis wide sump has been utilised to help with weight distribution by involving purpose designed cavities for machined Densamet blocks. These blocks can be positioned both within and on top of the sump for chassis weight distribution.

The bell housing incorporates internal water ways that will allow the option to run a single or dual pass radiator system. Also, the water system header tank has been incorporated within the cam cover, saving on space, ensuring ease of access and negating the need for a separate unit.

Ongoing Development



Engine development utilising testing equipment such as the flowbench will be continuous throughout the racing season.



Piston and piston ring combinations have been a particular area of development.

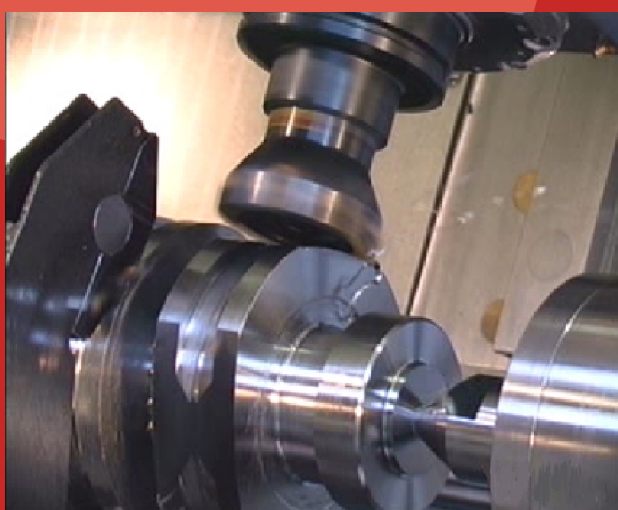
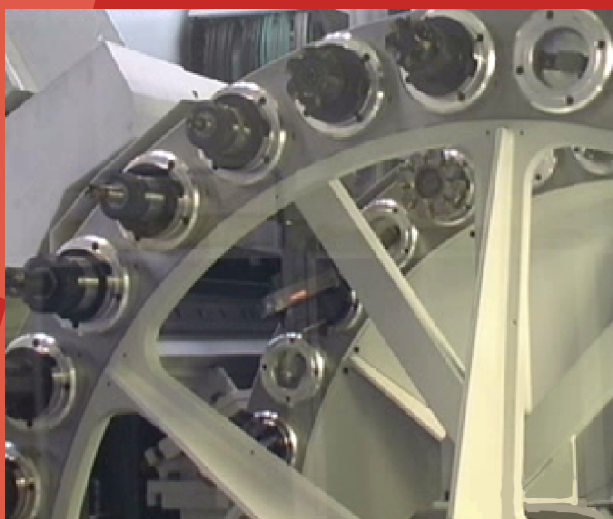
Development has continued throughout 2001 and currently projects are active in almost all areas of the engine package. Our in-house design, manufacture and testing will allow us to continue on these development lines throughout the 2002 season and onwards.

Evaluation of various crank, rod and piston configurations have been, and will continue to be, assessed. Many other areas of the engine including valve train, cylinder head port configurations, optimisation of thermal efficiency and mechanical losses through out the engine have ongoing development programmes.

We have been working with AP regarding the clutch and have been developing the package with the latest AP - CP 7102 SA 140mm diameter twin plate carbon cushioned flywheel clutch.



Manufacturing



In addition to our existing machine shop, a recent investment for Swindon Racing Engines are two special application 7-axis machines. These machines will give us the in-house capability to produce crankshafts, camshafts, throttle bodies and many other machined items. An advantage to the Formula 3 project is the capacity to enormously reduce development time on such components, especially crankshafts which are renowned for generally long production times.

Furthermore to help increase productivity, we can use our 3D CAD models to quickly create machining paths using CAM software.

These new machines are currently being used by Ferrari and BMW to manufacture their Formula 1 crankshafts, simply because they enable faster development. In the UK the machines are very rare giving Swindon Racing Engines a unique in-house solution.

Costing Information

Engine Lease Cost:

Engine annual lease including access to spare engines: £18,500

Main Engine Includes: Complete Exhaust System, Airbox Assembly, Flywheel, Engine Loom, Engine Sensors, Coils and Travel Case. This package includes access to spare engines during British Championship races and FOTA tests at no additional costs.

Optional complete dedicated spare engine annual lease: £15,000

Engine specification as above. For teams that compete in regular testing away from the official FOTA tests, a dedicated spare engine can be leased. Note: by having a dedicated spare engine, you are still eligible for the spare engines at British Championship races and FOTA tests at no extra cost. (ie. You will have access to 2 spare engines)

Optional dedicated spare engine annual lease: £13,500

As above excluding the exhaust system and airbox assembly.

Please note:

The Swindon-Ford engine price reflects our innovative installation package, which incorporates:

Cam cover

- Direct mounting to the bell housing and chassis (no need for additional engine/car mountings)
- Header tank incorporated in the cam cover

Sump

- Direct mounting to the bell housing and chassis (no need for additional engine/car mountings)
- The provision for integrated ballast

Exhaust

- As an integrated item with the power unit, the exhaust is included in the engine lease package.

Service costs:

Service costs are determined on the maximum number of kilometres completed in a season. Costs are calculated as an all in one package ensuring your engine is kept at its most competitive at all times.

Kilometre Bracket	Package Cost	Total (without a dedicated spare)
10,000	£30,000	£48,500
12,500	£36,875	£55,375
15,000	£43,500	£62,000

Additional 2500km usage will cost £8000 over and above the original selected service pack

Included in the service cost is:

- Use of spare ECU's, sensors and engine looms
- Full track support for the British Championship series
- Engine exchange during rebuilds
- All scheduled full engine rebuilds and parts
- All scheduled intermediate services and parts
- All scheduled dynamometer tests
- All development part updates
- Race support truck assistance with workshop and data analysis equipment
- Race win bonus of £1000



Costing Information

Payment Schedule

1 st December 2001	20%
1 st February 2002	30%
1 st April 2002	20%
1 st June 2002	15%
1 st August 2002	15%

Deposit

Each engine will require a security payment to Swindon Racing Engines. This deposit will be given with order.

Engine # 1:	£10,000
Engine #2 and upwards:	£6,000

Notes and Information:

The equivalent parts for a conventional installation kit and exhaust would cost approximately £2800. These parts are integrated in the Swindon-Ford engine package.

European service options should be discussed with Andy Pycock.

Service costs do not include engine damage due to over-revving, over heating, accident or negligence and it will be the financial responsibility of the lessee. Parts and labour will be charged at an applicable rate.

Additional test support outside the British Championship rounds and FOTA tests will be charged at £265 per day, plus the cost of any flights, ferries and hotel expenses. Normal race engineer transport and food within the mainland UK is included in the above cost.

If you wish to paint your airbox in team colours, the airbox will have to be purchased.

Densamet ballast blocks that are machined to fit within the engines sump can be purchased from Swindon Racing Engines.

Engines will be returned at a maximum of:

1250km's for - Intermediate Service - includes labour to perform a leak down test, borescope check, tappet check and reset. Also includes a power run on the dynamometer.

2500km's for - Routine Full Engine Rebuilds - includes labour to strip, inspect, rebuild, run-in and power test on the dynamometer. Also includes all specified parts including: bearings, rings, seals, gaskets, fasteners and valve springs.



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Just off the M4 motorway, Swindon Racing Engines is conveniently positioned between London, Bristol and Oxford.

Less than an hour away from Heathrow and Bristol International Airports we are very easy to visit. We are also convenient for Silverstone, Castle Combe and Thruxton

Navigation Point 1: Junction 15 on the M4

Navigation Point 2: Oxford (A420) round about on the A419

Navigation Point 3: Retail Park/WH Smith round about on A4312

