



Racing Data Power

LCU-ONE

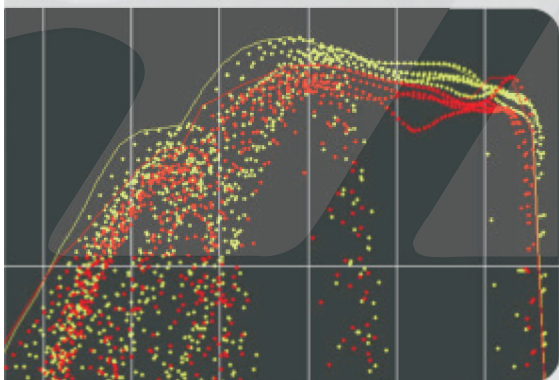
FULL CONTROL OF YOUR ENGINE

ON-TRACK SESSIONS



ACCURATE MONITORING

Of your kart carburator



AN EASY-TO-USE SOLUTION

To analyze A/F ratio, Lambda value, sensor temperature and diagnostics

Date: 1 April 2007

Track: Gordona (SO, Italy)

Kart: Birel EasyKart 125

Engine: IAME Leopard 125cc

Instrumentation:

AIM MyChron4 + LCU ONE

ENGINE ANALYSIS

### Forewords

The test was aimed to check the correct functionalities of the Lambda probe on two strokes engines, with exhaust system gas containing oil residuum after combustion.

The mixture was 95% motor gasoline and 5% castor synthetic oil (Shell M type).

The Lambda sensor is a Bosch LSU 4.9.

The kart has been running for a total of 70 laps.

We remind you that a Lambda value  $< 1$  stands for a rich mixture while a Lambda value  $> 1$  stands for a lean mixture.

It is not given that competition engines offer their maximum performance at an AFR=1 value.

Generally, it is advisable to use richer mixtures against lean mixtures. Every engine has its own lambda target, a Lambda value that gives maximum efficiency and top performances. LCU-ONE helps you in finding it and, test after test, gives you the chance to keep it under control.

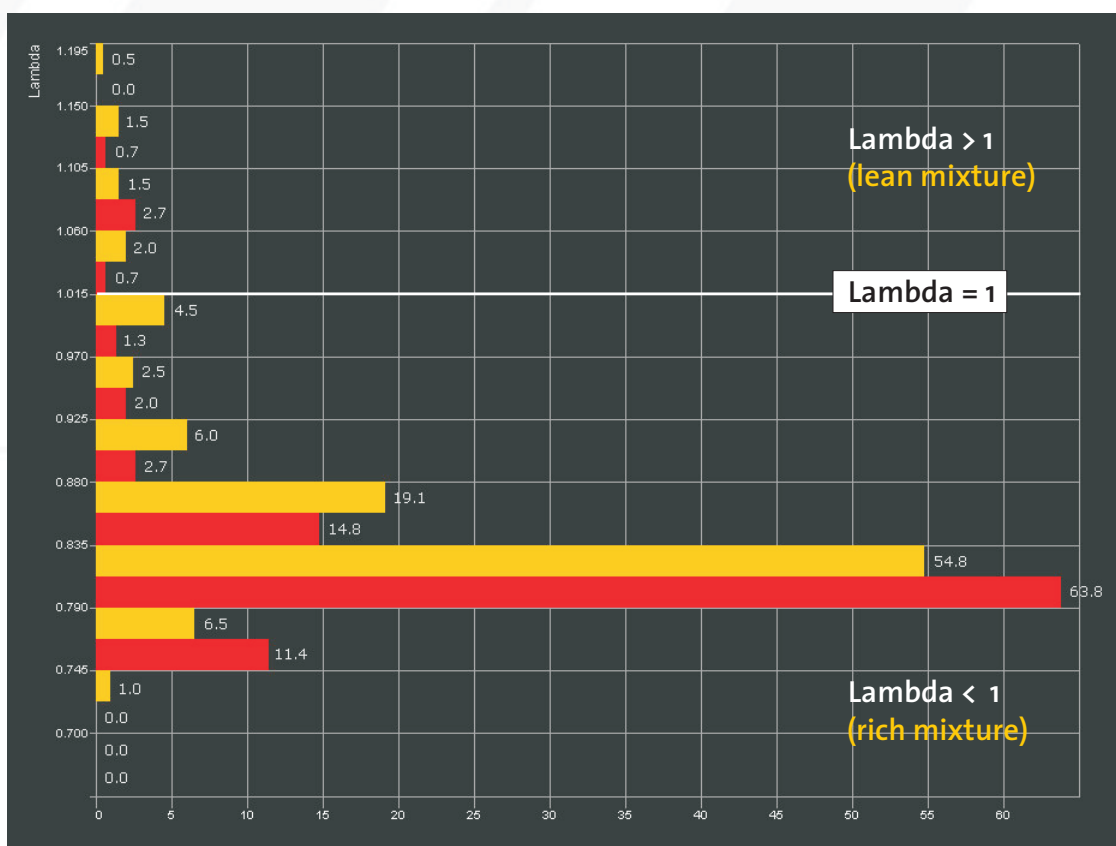
### Data analysis

These data refer to Gordona's race, part of the Italian EasyKart 125cc Heavy Championship.

The Lambda sensor was fastened to the central part (a tube of 47x80x1,5 mm) of the exhaust manifold.

The kart has been running for a total of 24 laps plus warm-up and exit laps.

As you can notice in the following pictures, the engine started with a carburation that was growing richer in the following 24 laps because of a wrong carburator setting. The carburator lost calibration and pressure.

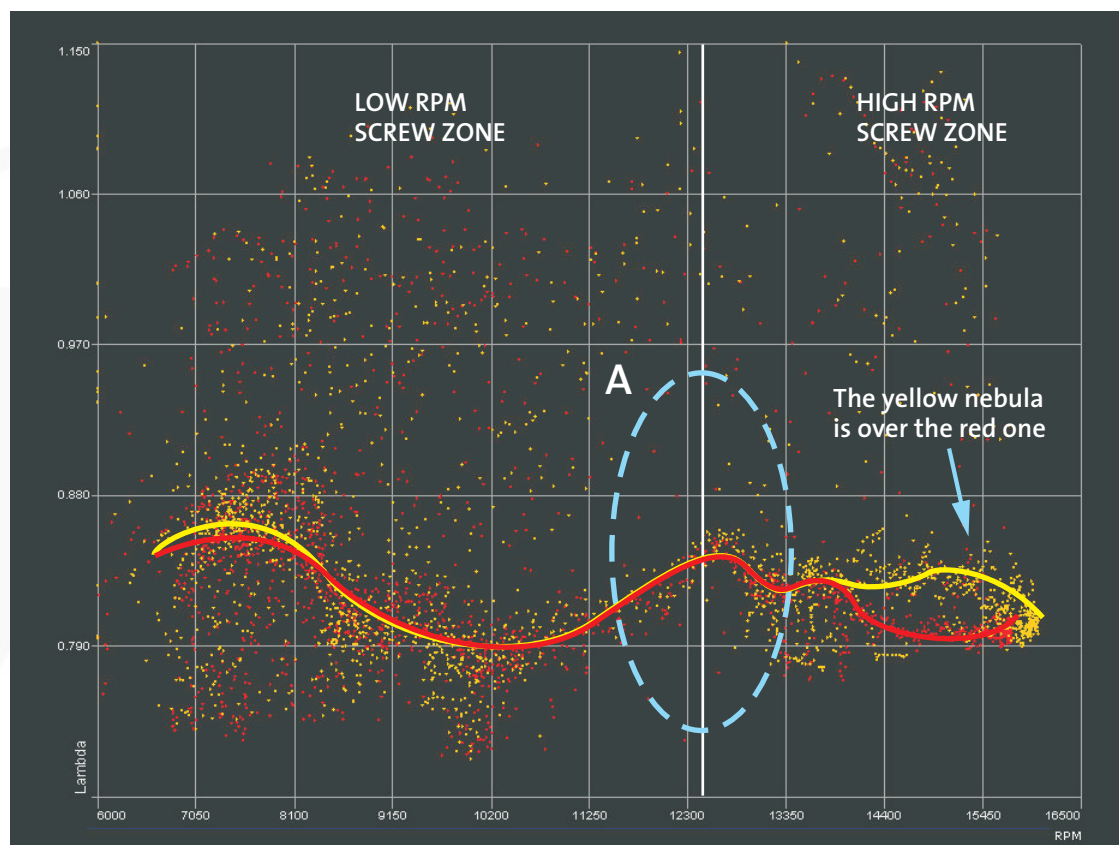


Picture 1

The yellow histogram shows the Lambda value of one of the first laps, while the red histogram one of the latest.

Notice that for  $\text{Lambda} < 0,85$  (lower part of the histogram) the red bars have a greater value, which means the engine worked richer for a longer time. The driver should correct carburator calibration by acting on the rpm screws.

A XY plot (X=RPM, Y=Lambda) shows that the engine was richer at higher RPM:

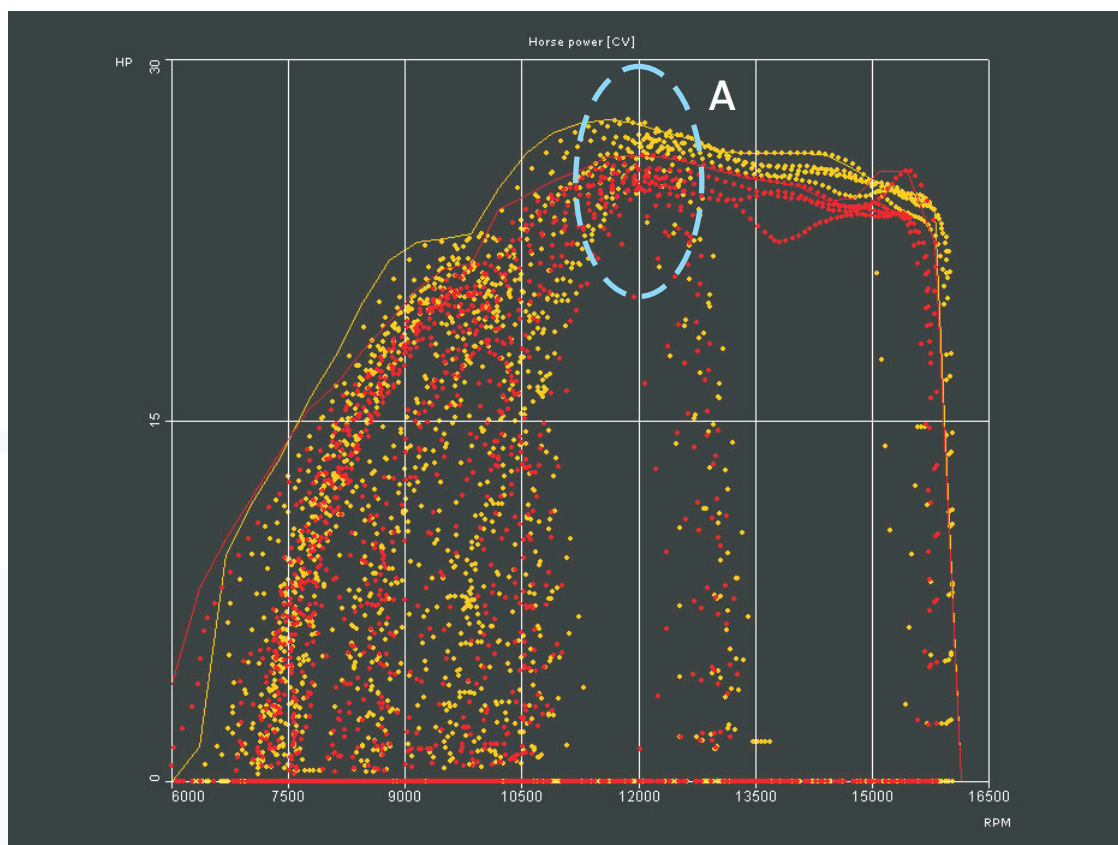


Picture 2

In the "A" zone, it's easy to notice the passage from the low RPM carburator screw to the high RPM screw. The RPM sweep can show that the lower RPM screw cannot feed the engine enough. Over the "A" zone, the high RPM screw starts working and giving feed to a richer combustion.

This is a limit of the fuel feed channels of the Tillotson HL 384-B carburator.

By analysing the power graph, it is evident that the engine lost HP's at high RPM's.

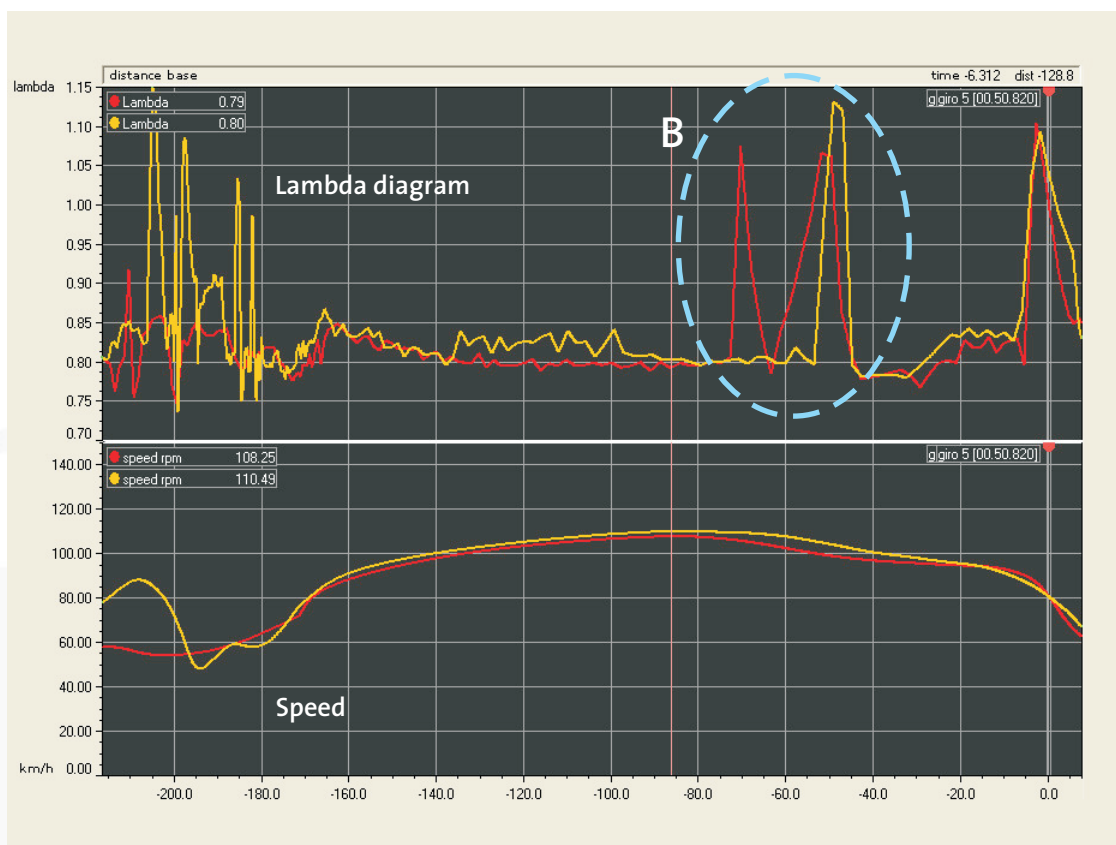


Picture 3

Crossing the “A” zone, when the engine is fed by the high RPM screw, a higher lambda value contributes to a higher power. In the red marked lap (close to the end of the race) weather conditions changed. The temperature was higher and the air was less dense. This caused a richer combustion as EasyKart rules state that it is not possible for the driver to modify the carburation while racing.

This influenced engine performances.





Picture 4

The yellow speed line, with a leaner engine, grows slightly faster (and is almost always over the red one).

Notice the Lambda upward spike in the "B" zone.

This is due to a throttle lift, when the engine revs high and the throttle butterfly is closed. LCU-ONE allows you to keep these enleanments under control, avoiding unwanted engine jams.

This test evidenced that this engine - with a race setup - works at its best with a Lambda value of 0,84-0,85.



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