

### **In cylinder Pressure Analysis**

The file press.xls and Kawaski600cc.xls on the website contain pressure-crank angle histories for three engine test conditions in the press.xls of a typical naturally aspirated car engine, while Kawaski600cc.xls has two other test conditions of a turbocharged engine. The primary parameter varied was the spark timing in press.xls while it was rpm and boost in Kawaski600cc.xls).

For three different tests, all 5 if you want but minimum three using the two from the Kawaski,

- 1: Plot the pressure-crank angle history (linear scales) and the  $\log(p)$ - $\log(V)$  diagram
- 2: from the  $\log(p)$ - $\log(V)$  diagram, determine the polytropic index for the compression and expansion strokes (*i.e.*  $n_c$  and  $n_E$  in  $pV^n = \text{constant}$ ).
- 3: determine the gross work, pumping work and net work
- 4: determine the Indicated Mean Effective Pressure
- 5: for the test series at least two test conditions one from the Naturally aspirated and one from the Turbocharged, compute the mass burned fraction history using the Rassweiler and Withrow equation.

NB the pressure in the Kawaski600 file needs to be pegged to the Manifold Absolute pressure. You may want to comment on the effect this has on your analysis.