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Investigation into the relationship between injection pressure, duration and frequency in common-rail injection systems

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2015-05-14
http://hdl.handle.net/10539/18373

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Abstract

This report investigates Common Rail Compression Ignition Engines, motivating for research on relationships between injection pressure, duration and frequency, and their effect on injector flow rates. The objectives were to investigate these relationships by means of both research and testing, employing the following methodology:

- Carry out a substantial review of the research and testing that has been done in this field.
- Develop the test rig and carry out tests.
- Analyse and interpret the results

The main findings from this research and testing included:

- Injection duration (under constant rail pressure and injection frequency) had no effect on the flow rate.
- Changes in the injection frequency did not produce any change in the flow rate.
- The flow rate fluctuated linearly with rail pressure. Injection duration and frequency were independent to each other, but further testing on this is required under different conditions.

These findings generally correlated well with previous research by others.