

Pressure-based ignition delay

Ignition delay in a diesel engine is defined as the time interval between the start of injection of fuel and the start of combustion. Ignition delay is an important quantity to be measured when studying diesel combustion, as it relates to the amount of pre-combustion mixing, or the fuel-air mixture preparation that occurs, prior to the onset of ignition in a typical diesel engine. The ignition delay is mainly influenced by the engine design, operation, and the fuel characteristics.

Ignition delay can impact on the power output, combustion efficiency (fuel usage efficiency and pollutant emissions) and engine maintenance. For example, with a short ignition delay period, a relatively small amount of fuel is mixed prior to the onset of combustion. The majority of the fuel injected is therefore burned through a mixing-controlled diffusion process, and this can lead to the generation of high levels of smoke and nitrogen oxides. A relatively large amount of fuel that would have been injected and vaporized within the engine cylinder, prior to the occurrence of ignition, with a long ignition delay. The ignition of this large amount of accumulated vapour can result in a sudden and abnormally high rate of pressure rise and large cylinder pressure during combustion. This can lead to a poor running of engine, or the damage of engine components, in the extreme.

Key contact: [A/Prof Shaun Chan](#)

School of Mechanical and Manufacturing Engineering

Email address: qing.chan@unsw.edu.au