

Heat Engines and Environmental Protection 2011

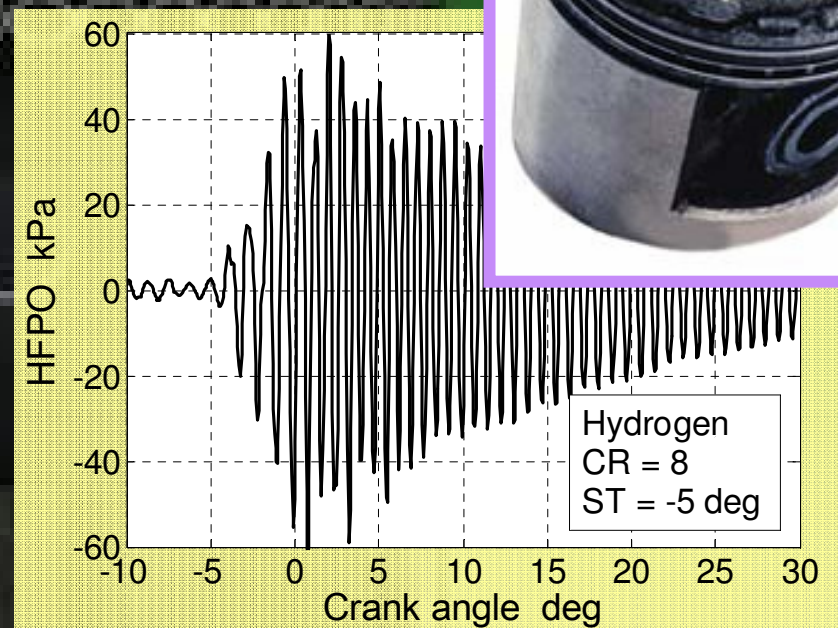
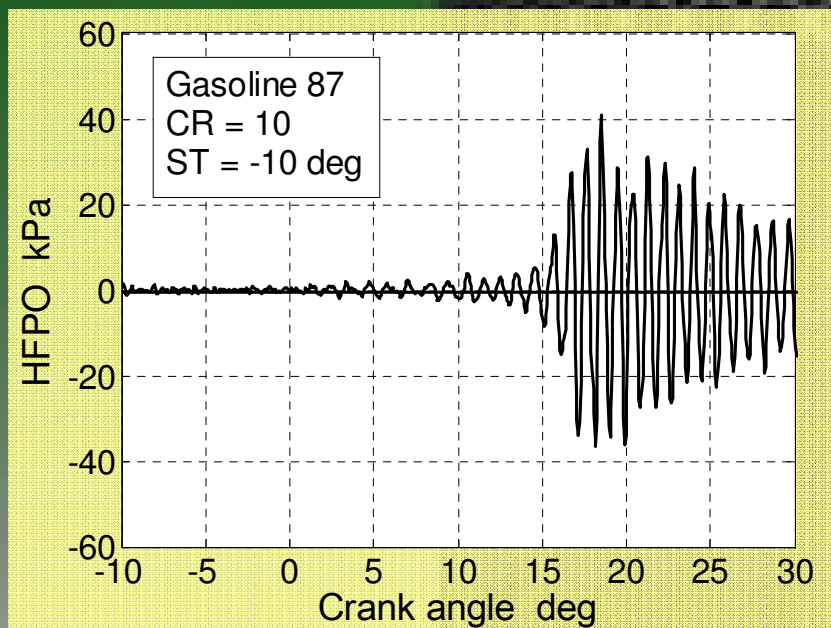
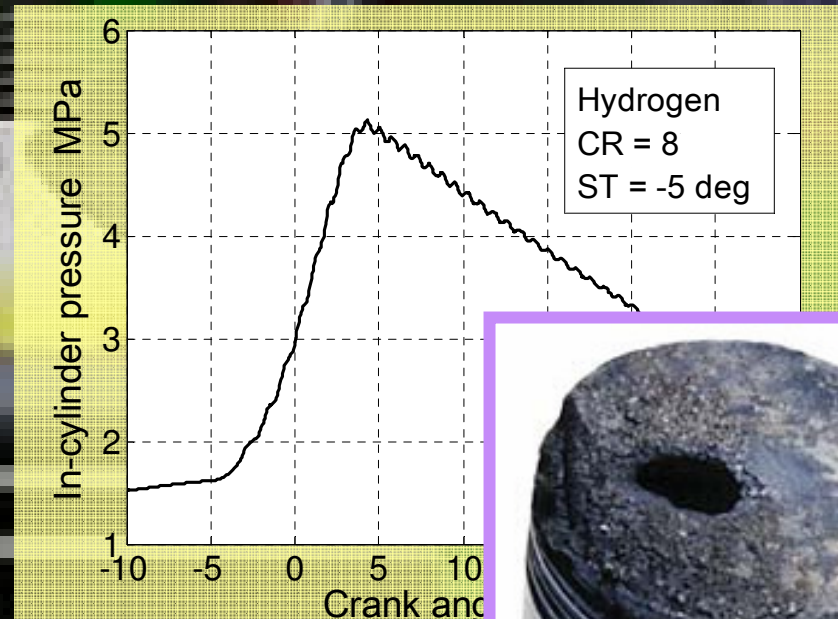
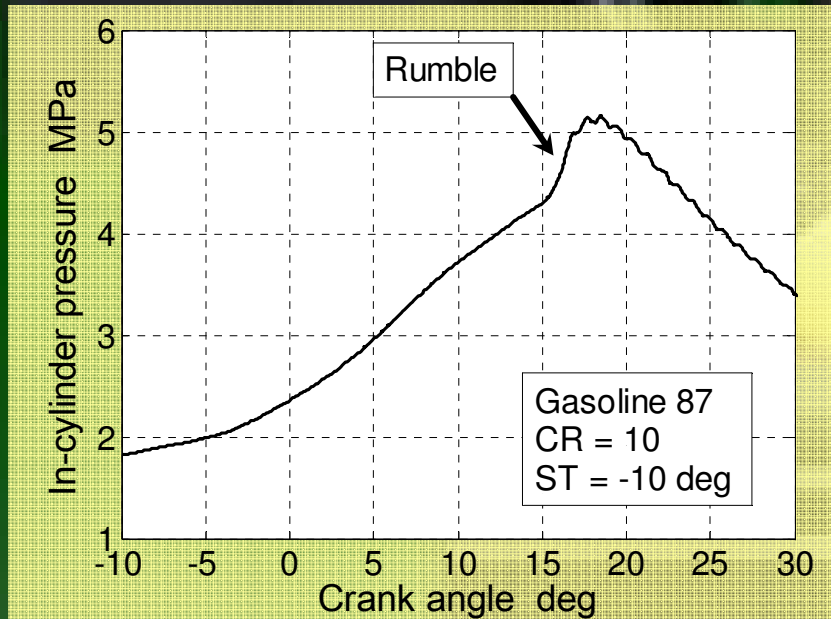
Hydrogen Combustion Knock Analysis

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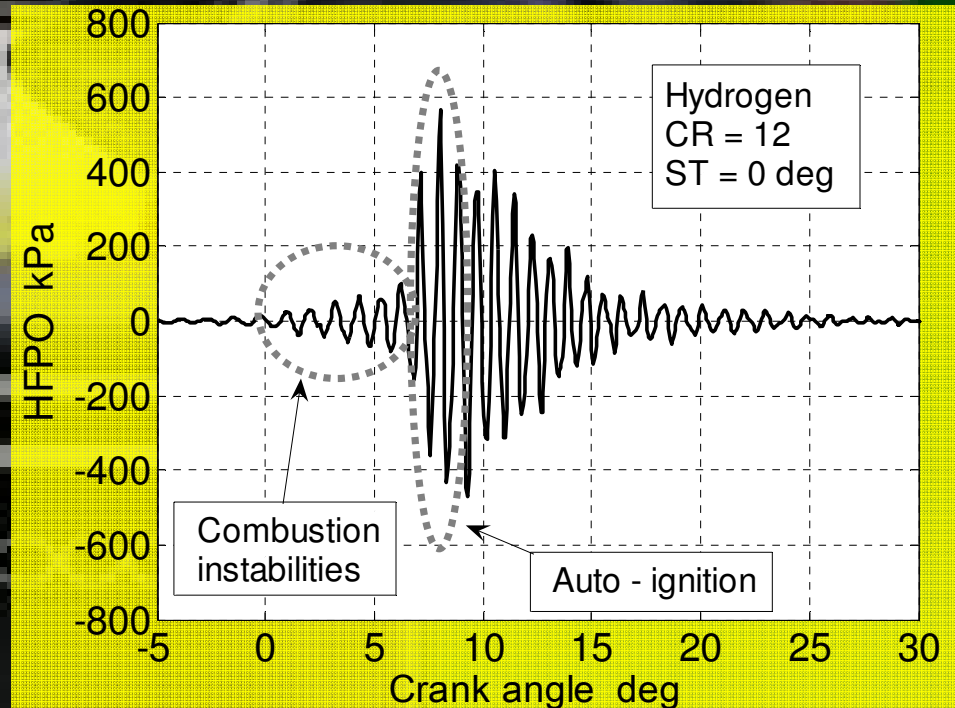
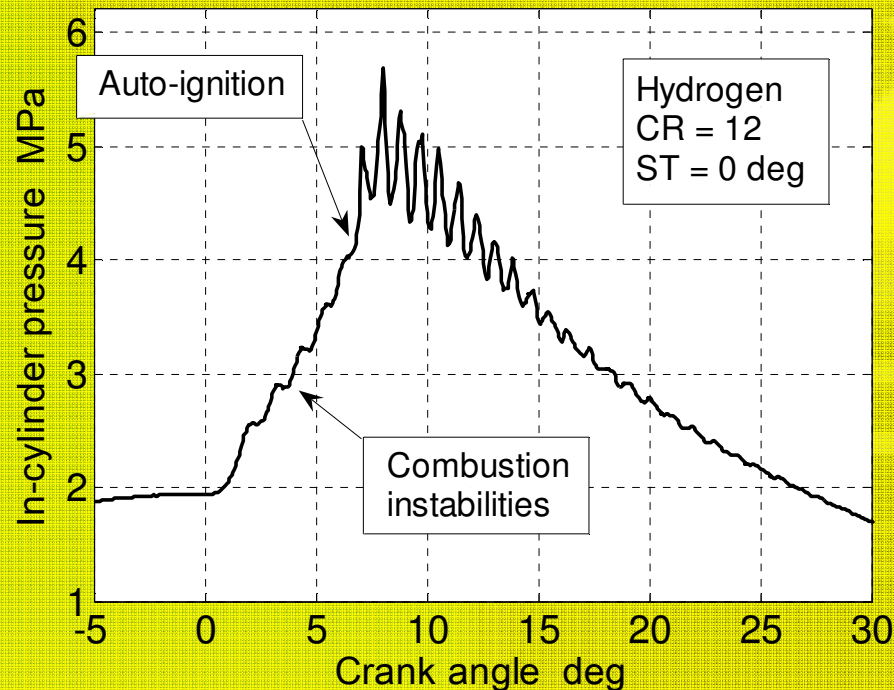
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Knock from combustion instabilities



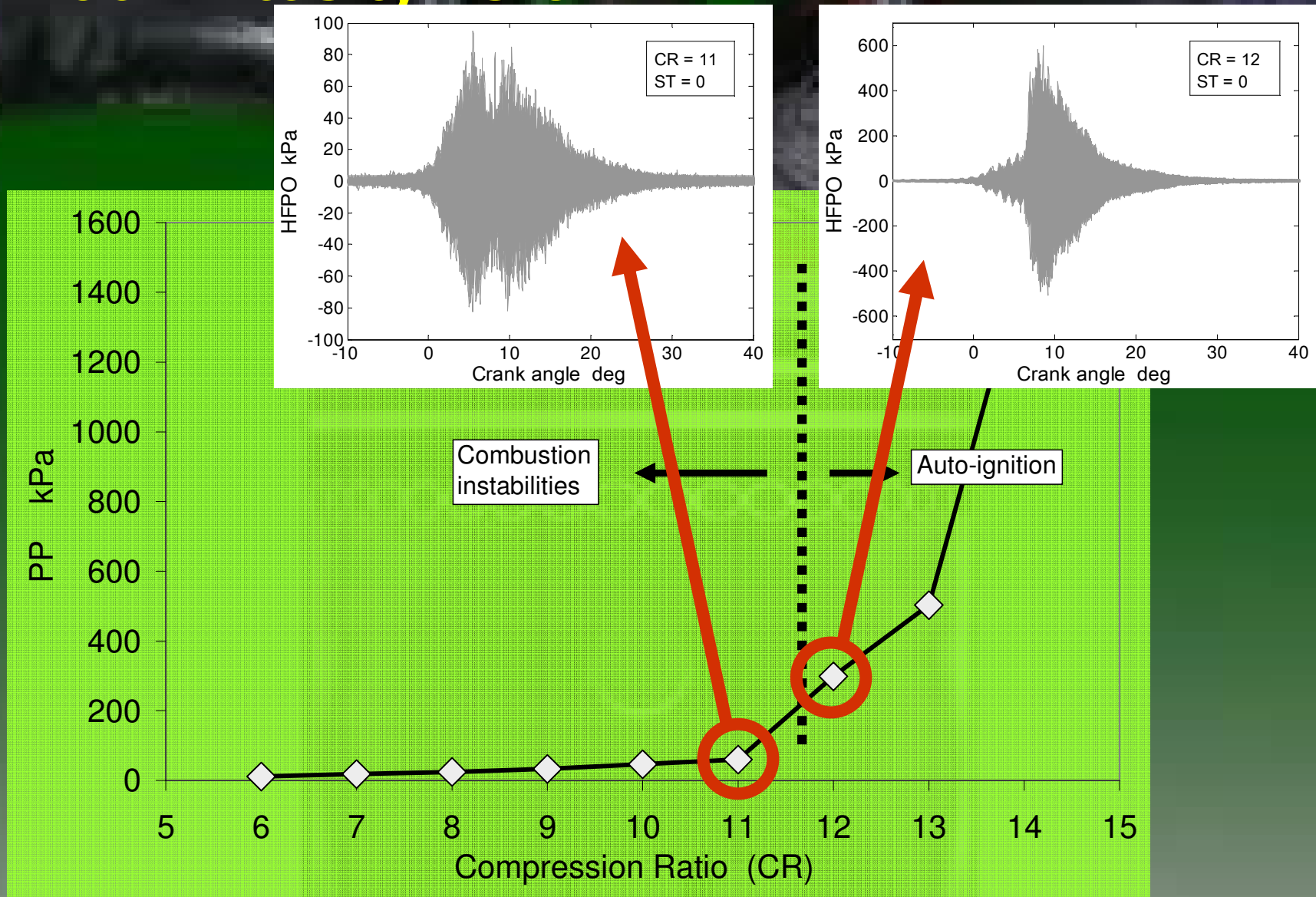
In-cylinder pressure (top), filtered pressure oscillations (bottom)

Knock from autoignition



In-cylinder pressure (left), combustion oscillations filtered from the pressure trace (right)

Knock intensity vs CR



CONCLUSIONS

Hydrogen knock expressed by pressure oscillations with amplitude of **10 kPa up to 1 MPa and more**

- below 10 kPa
- 10-100 kPa
- over 200-300 kPa
- combustion noise
- “weak” hydrogen knock by combustion instabilities
- “strong” hydrogen knock by auto-ignition

A close-up photograph of a diesel engine's combustion chamber. A bright yellow flame is visible at the top, where the fuel is being injected and ignited. The surrounding components are dark and metallic, with some visible wear and tear. The background is a solid green color.

Kössönöm

Thank You for Attention

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