

MEASUREMENTS IN A MOTORED INTERNAL COMBUSTION ENGINE

APPLICATION NOTE PIV-006

The flow in reciprocating internal combustion engine cylinder is turbulent and highly complex. The global measurement capability of PIV is advantageously used to examine the nature of the flow inside the engine cylinder.

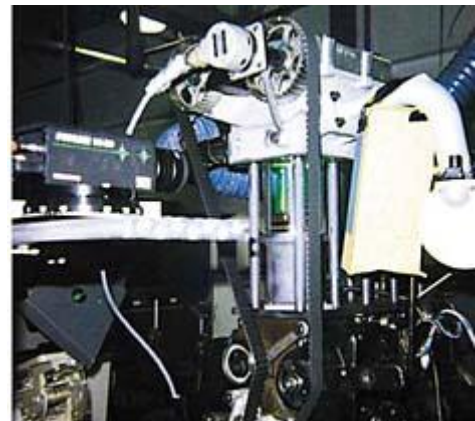
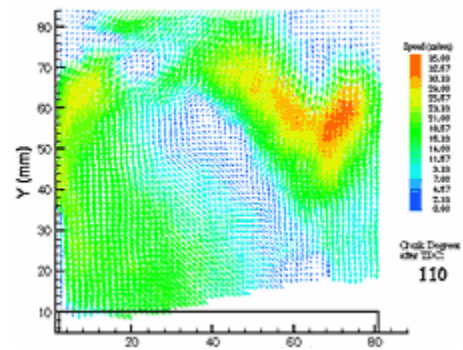
The POWERVIEW StereoPIV system consisted of a pair of frequency-doubled Nd:YAG lasers, an articulating light delivery arm, light sheet optics, a PIVCAM 10-30 camera with $1K \times 1K$ pixel resolution, a high-speed interface board and INSIGHT image acquisition and analysis software. The light sheet was in the vertical plane and the camera was set up in the horizontal plane measure the velocity field.

Phase-locked PIV measurements allowed the image-capture and analysis at the desired piston position (i.e., phase angle).

From these instantaneous fields, phase-averaged velocity fields and related properties were obtained.

In this experimental setup, since the light sheet was introduced at an angle, the shadow region created by the piston head has no illumination. Hence, the figure shows no velocity vectors in the shadow region.

In-Cylinder Velocity Field Measurements
(Phase-Locked, Ensemble-Averaged Velocity Fields)





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