

ABSTRACT:

The developed Digital Image Analysis (DIA) system has been examined in terms of its capability to characterise the high speed, fine droplet at downstream of a spray atomiser. The architecture and working principle of the DIA system were explained. This system has employed a high intensity pulsed laser as a light source and a digital camera to capture the droplet images. The DIA technique has been implemented in extracting the valuable information of spray droplet from the images. Image processing algorithms were applied in the development of the software and they were described in this paper. In order to evaluate the repeatability of the DIA system, the measurement of droplet size was repeated several times. The deviation result has confirmed that the DIA system has a good repeatability on sizing the drops. The available methods to characterize the droplet spray were briefly explained. The DIA system was used to investigate the effect of a circular cylinder on the drop size of an atomizer at downstream of the spray flow. The cylinder was introduced at 250 mm downstream of the nozzle exit. The measured mean drop size for 'with cylinder' and 'no cylinder' were at 9.2 and 8.1 urn, respectively. It was observed that due to the coalescence of the drops after it passed through the cylinder, the mean drop size were found to be slightly larger when the circular cylinder is introduced.