



Experimental Methods for Engineering Mechanics

Group 6 - Bonus Contribution

Module 2: DIC AND PLANAR ELASTICITY

How to achieve a good speckle pattern for samples used in DIC?

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1 Speckle Patterning

1.1 General Guidelines

The speckle pattern on a studied sample is one of the key steps in Digital Image Correlation (DIC). It also dictates the accuracy of the results generated. We list now the conditions to obtain a good quality speckle pattern based on [1]. The speckle pattern should sufficiently cover the region of interest. Different speckle densities are shown in figure 1. The speckles should be both random yet uniform in size. The pattern should as well be compliant and deforms as the sample deforms.

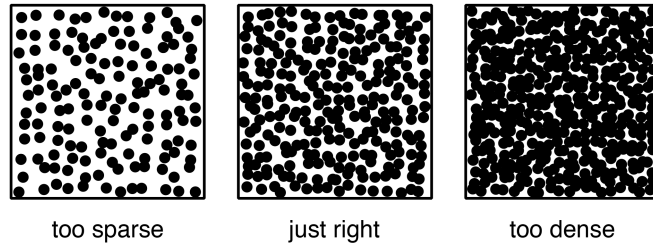


Figure 1: Speckle Densities. The middle speckle pattern density of 50% is desirable.

One check if the speckle density is sufficient and appropriate is observing the gray-scale contrast. This can be done by generating a histogram showing the number of pixels plotted with respect to the gray-scale level. The software on the lab computer corresponding to the Quantalux 2.1 MP Monochrome sCMOS Camera from THORLABS is capable of generating this graph. The camera used can be seen in figure 2. There exists several online generators and Python packages as well to generate the gray-scale histogram.



Figure 2: Camera used for DIC Analysis. The camera used in the experiment was a Quantalux 2.1 MP Monochrome sCMOS Camera from THORLABS.

The histogram should resemble a bimodal Gaussian distribution with two peaks visible in figure 3.

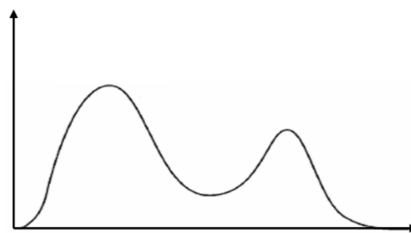


Figure 3: Bimodal Distribution. This distribution features two peaks.

