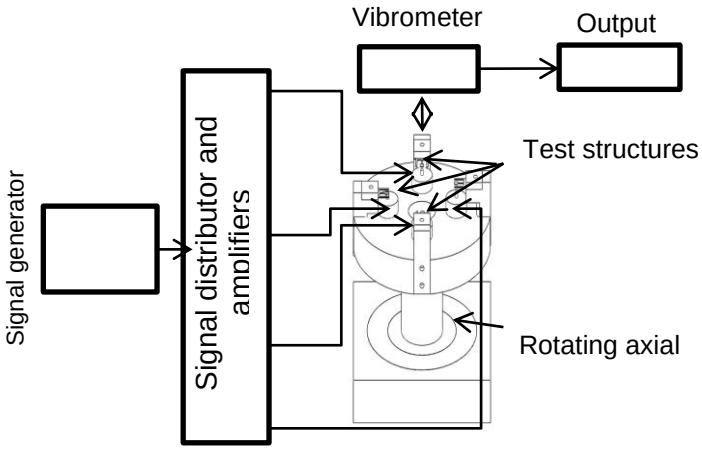
Bachelor or Master Thesis

Fatigue analysis of micro-structures

The phenomenon of fatigue is not only important to academic but is also a point of great interest and research in industries. Fatigue causes more than 90% mechanical service failures ranging from automation, aviation and energy industry to medical devices and many more.

A fatigue testing setup is already running in the lab. The setup tests different specimen around their resonance frequency by electromagnetic excitation. Laser vibrometer is used to measure displacement and hence calculate stress in the tested specimen. Fig. 1a shows the working arrangement of the fatigue testing setup.



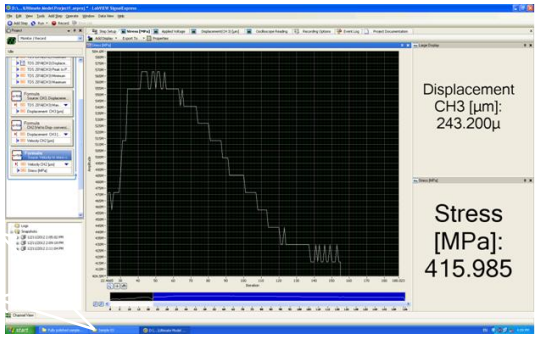


Fig. 1(a): Electromagnetic excitation setup for fatigue test (b). Stress drop during crack development

The stress level drops during the generation of crack during the test as is evident in Fig. 1(b). In order to maintain a fixed amount of stress on the test specimen a feedback is required to control the amplified signal and bring the stress level to the same amplitude. In addition to this material test and fatigue fractography are also a main part of the thesis.

Learning opportunities

1. Lab view
2. Fractography using SEM and optical microscope
3. Metallography
4. Simulations

Contact for details:

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