MidTerm Report SURGE 2022 Research Project Title-SOAP FILM TUNNEL

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MID TERM EVALUATION

AIM: Flow past a square cylinder in a flowing soap film.

REQUIREMENTS FOR EXPERIMENTAL SETUP:

A Monochromatic light source (low pressure SOX lamp)

Soap Solution filled Reservoir

Guide wire (0.7 mm diameter)

Pulling wire (0.4mm diameter)

Rotameter (to measure volumetric flow of soap solution)

WORK PROGRESS:

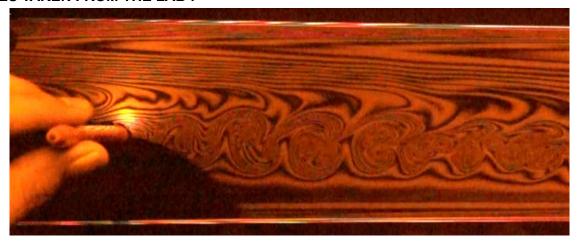
As we know, our first aim is to establish a setup for doing experiments. So, I was given to read some research papers. After reading papers, I came to know about how to generate the liquid(soap) film?, how to visualise the fringes in soap film?, how to find the thickness of the film? and how to find Reynolds' number of the flow?, etc. I went through some research papers given in references and helped to finish the setup.

Now, the setup is completed and I have started doing the experiments. I have visualised fringes in a flowing liquid(soap) film through light interference effects. These effects can be produced by small variations using flow disturbing objects such as cylinders, wedges or air bubbles but I have used a pen to visualise fringes and vortex shedding. I have also fixed the position of a high FPS camera.

KEYWORDS:

- 2-D Visualisation Technique to examine the flow patterns of soap solution around a test object.
- 2. Monochromatic light source (low pressure SOX lamp) is used to detect the vortices formed by the flow of soap solution when a flow disturbing object(test piece) is placed in its path. This lamp works by creating an electric arc through vapourized sodium metal.
- **3. Velocity Measurement** can be done by judging the position of the vortex in the wake region as measured by a high FPS camera.

IMAGES TAKEN FROM THE LAB:





REFERENCES:

- 1. https://link.springer.com/content/pdf/10.1007/s003480050094.pdf
- 2. https://aip.scitation.org/doi/10.1063/1.1149232
- 3. https://link.springer.com/article/10.1007/BF03181514
- 4. <u>https://doi.org/10.1063/1.1366634</u>
- 5. <u>https://doi.org/10.1119/1.3596431</u>