ME 352A

Lab 6: 2 Plane Balancing

Aim: To balance the rotor using 2 Plane Balancing

A Crosscheck: When the rotor is completely balanced then on rotating it at different rpm, it will not undergo vibrations.

Procedure:

1) You are being provided with 4 masses ($m_1 = 250g, m_2 = 240g, m_3 = 230g, m_4 = 220g$)
2) Place masses $m_1\ and\ m_2$ at $x_1 = 5.5cm\ and\ x_2 = 14.5cm$ at orientations $\theta_1 = 0^o and\ \theta_2 = 70^o$ respectively. This is the unbalance to begin with, and to check the effect do the following:
    a. Hang the device
    b. Rotate the shaft using the motor and notice vibrations the entire device undergoes.
3) To balance the system, the two planes where we would be adding masses are located at following distance from the reference bearing: $x_A = 3.8cm\ and\ x_B = 16cm$
4) Using the 2 plane balancing approach place other two masses on these planes (each plane will have one mass).
5) Perform the check of unbalance by rotating the rotor.

Important Note:

- As you will not be able to tune up masses and eccentricity in this setup, just perform fine adjustment on the axial location of planes.
- While performing the check, hang the rotor and then after the check is performed, fix the rotor setup using bolts.
- While rotating, ENSURE that you start with 0 rpm and then gradually increase the rpm.

Report:

- 2 Plane balancing calculation
- Tabulate the theoretical and actual results.
- Compare the obtained result of two plane balancing with the "vector polygon" based approach you did in previous lab (only theoretical)
- Report sources of error

Part B: Observation Task
Aim: To observe reciprocating unbalance

Procedure:

- Add the mass (0kg, 0.5kg, 1kg and then 1.5kg)
- For each added mass observe the vibration in the system by rotating the crank.
  (here too ensure that you start the rotation from 0 rpm then increase it gradually)

Report:

- Qualitatively argue the nature of vibration on adding extra mass.