

**FINAL PROJECT**

**DETERMINATION OF TUNED LIQUID COLUMN  
DAMPER FREQUENCY AND DAMPING RATIO  
USING PENDULUM VIBRATION SYSTEM**

Is Proposed as One of Requirements to Finish Undergraduate Program

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## ABSTRACT

Nowadays, one of the most popular dynamic vibration absorbers is TLCD (Tuned Liquid Column Damper). TLCD is a passive vibration control system that doesn't need external energy to suppress the vibration response. TLCD can absorb the vibration of the structure by transferring the energy of vibration to the movement of liquid inside TLCD. TLCD can simply use for any type of structural design and its application doesn't need to change the existing structural design. To use this absorber, some parameter, such as natural frequency and damping ratio of TLCD must be determined.

This research is conducted to determine TLCD natural frequency and damping ratio using pendulum vibration system. Simulation study and experimental testing are performed to determine TLCD parameters. From known natural frequency of the dynamic pendulum with TLCD system, natural frequency and damping ratio of TLCD can be predicted and those parameters can be proved by simulation study. For a dynamic pendulum system that has the natural frequency between 1.47 Hz and 2.03 Hz, parameters of TLCD obtained are 10.743 rad/s for natural frequency and 0.05 for damping ratio.

The simulation result shows that the TLCD predicted parameters from natural frequency of dynamic system and simulation parameters of TLCD is approaching. It proves that the natural frequency and damping ratio of TLCD can be determined from natural frequency of the pendulum system.

**Keywords:** TLCD, simulation study, natural frequency, damping ratio.