

FINAL PROJECT

EVALUATION OF TLCD DAMPING FACTOR USING FRF MEASUREMENT DUE TO VARIATION OF ORIFICE BLOCKING RATIO

is Proposed as One of Requirements to Finish

Undergraduate Program

UNIVERSITAS ANDALAS

By :

MARSHAL

BP. 1210912008

Supervisors:

Dr. Eng Lovely Son

Prof. Dr.-Ing Mulyadi Bur



MECHANICAL ENGINEERING DEPARTMENT
FACULTY OF ENGINEERING – ANDALAS UNIVERSITY
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ABSTRACT

Serviceability of buildings has been emphasized due to an increase in the construction of high-rise buildings and resident requirements. The increasing height and span of structures are resulting in their increased vulnerability to environmental forces such as winds, earthquakes and sea waves. Tuned Liquid Column Damper (TLCD) systems can be considered as a particular type of passive mass dampers. Even though several TLCD models have been proposed and many optimization algorithms have been developed, however, it is very low researches that have been conducted to evaluate the TLCD damping factor experimentally. A simple method to adjust the TLCD damping factor is by varying the orifice blocking ratio.

In the research, 5 types of orifice blocking ratio are varied in the TLCD. They are without orifice, 2 hole orifice TLCD, 4 hole orifice TLCD, 6 hole orifice TLCD, and 8 hole orifice TLCD. The data obtained is in frequency response function showing magnitude of structure model's natural frequency. Impact hammer is used as the excitation force.

The result shows that the TLCD with orifice is better in damping vibration compared to the one without orifice. The smaller orifice blocking ratio the better TLCD damping the vibration. The 2 hole orifice TLCD fails to dampen the vibration since the orifice blocking ratio is too small and TLCD becomes too stiff. The optimum condition of a U-Shaped TLCD orifice blocking ratio is 29.23% which has 4 holes of 18 mm orifice diameter.

Keywords: TLCD, orifice, damping factor, blocking ratio.