

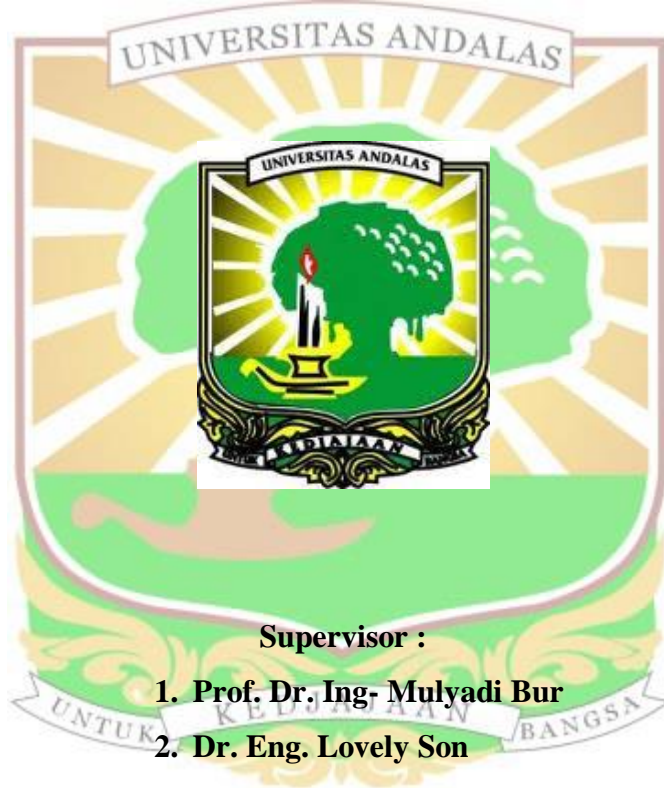
FINAL PROJECT

**FORCE RECONSTRUCTION OF TWO DEGREE OF
FREEDOM SHEAR STRUCTURE USING ACCELERATION
RESPONSE**

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ABSTRACT

An excitation force acting on a structure should be known in order to measure the endurance of a building. This excitation force can emerge from the environmental such as wind, sea wave, earthquake and volcanic activity. To measure the magnitude of the excitation force that can be hold by a structure, generally the measurements of the excitation force is conducted by using force sensor. But there are some problems occur when using force sensor such as the safety or the difficulty to determine the right spot that directly hit by the force. To ease the measurement and avoid those problems, this research measures the excitation force of a structure using force reconstruction technique. This technique is conducted by utilizing the system responses which occur from a structure and then process it into force reconstruction. This technique is used to predict the force excitation that hit a structure without doing a direct measurement.

The research held simulation testing using MATLAB® software and experimental testing using two DOF shear structure modelling. In simulation program this research use Wilson- θ method to collect the system response while in experimental testing exploits exciter as the excitation force to produce the system response and apply accelerometer to collect the responses. The variation is given to the excitation frequency for each testing.

The result shows that the excitation force which given to the modelling structure is precisely same with the result of force reconstruction. It proves that the force reconstruction technique is qualified to predict the excitation force that loaded into a structure.

Keywords: excitation force, force reconstruction technique, system response, Wilson- θ Method, exciter.