

**EFFECT OF BASE ISOLATOR SYSTEM ON  
UNIVERSITAS ATMA JAYA YOGYAKARTA'S  
LIBRARY**

Final Project Report

As one of the requirement to obtain S1 degree of

Universitas Atma Jaya Yogyakarta

By:

RICKY PRIYATMOKO

NPM: 121314317



**INTERNATIONAL CIVIL ENGINEERING PROGRAM  
DEPARTMENT OF CIVIL ENGINEERING  
UNIVERSITAS ATMA JAYA YOGYAKARTA  
YOGYAKARTA**

**2016**

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By:

Ricky Priyatmoko

121314317

Has been approved

Yogyakarta, 15<sup>th</sup>. December 2016

Advisor,



(Prof. Ir. Yoyong Arfiadi, M.Eng, Ph.D)

Approved by:

Head of Civil Engineering Department,



(J. Januar Sudjati, ST., MT)

## APPROVAL

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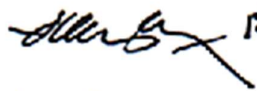




By:

RICKY PRIYATMOKO

121314317

Has been examined and approved by the examination committee

	Name	Signature	Date
Chairman	: Prof. Ir. Yoyong Arfiadi, M.Eng, Ph.D		15/12/2016
Secretary	: Dr. AM. Ade Lisantono, Ir., M.Eng.		16/12/2016
Member	: Anggun Tri Atmajayanti, S.T., M.Eng.		16/12/2016

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I realize, this report may be flawed. Therefore, I accept any form of suggestion for further improvement. Thank you

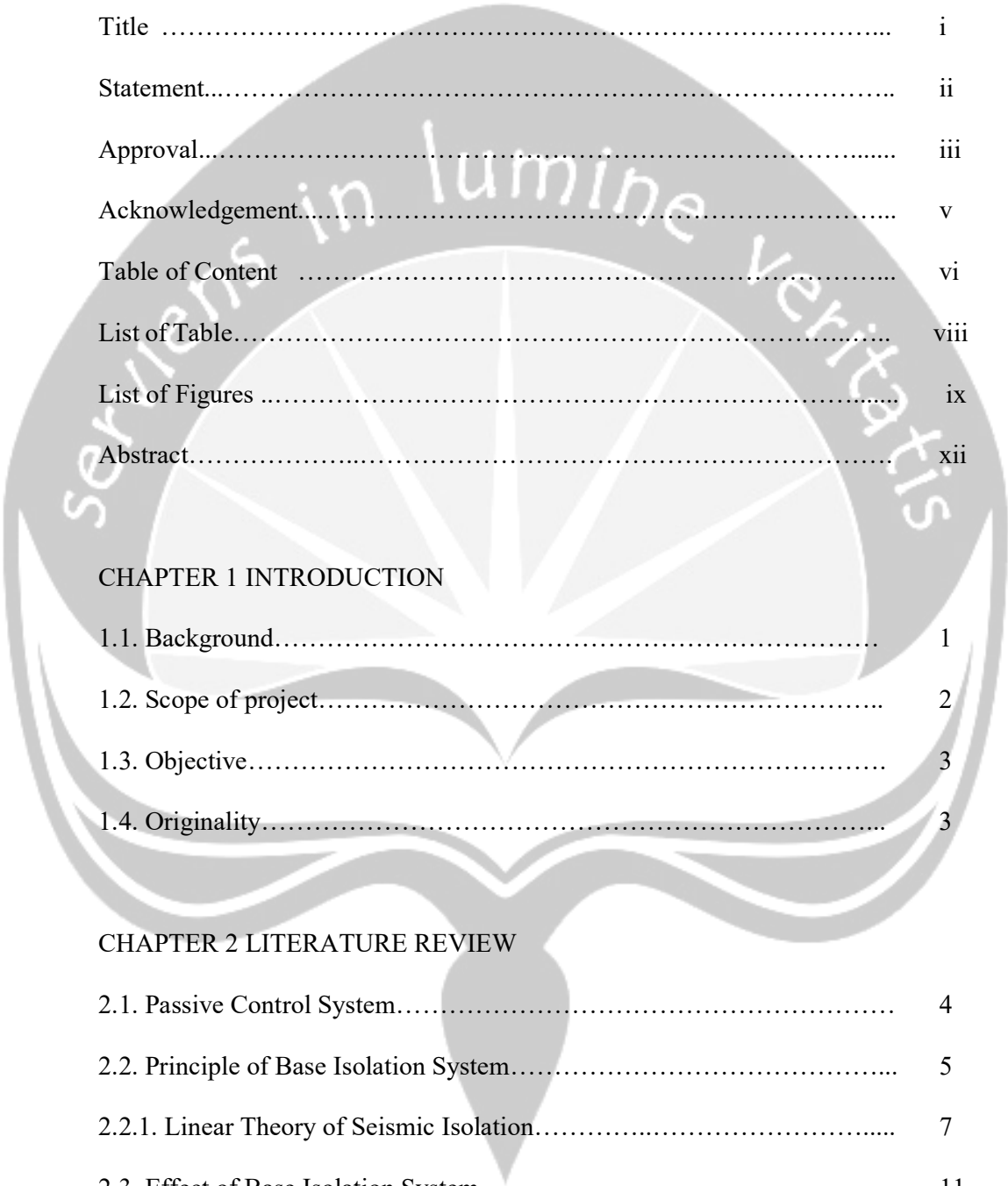
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The Author

Ricky Priyatmoko

121314317

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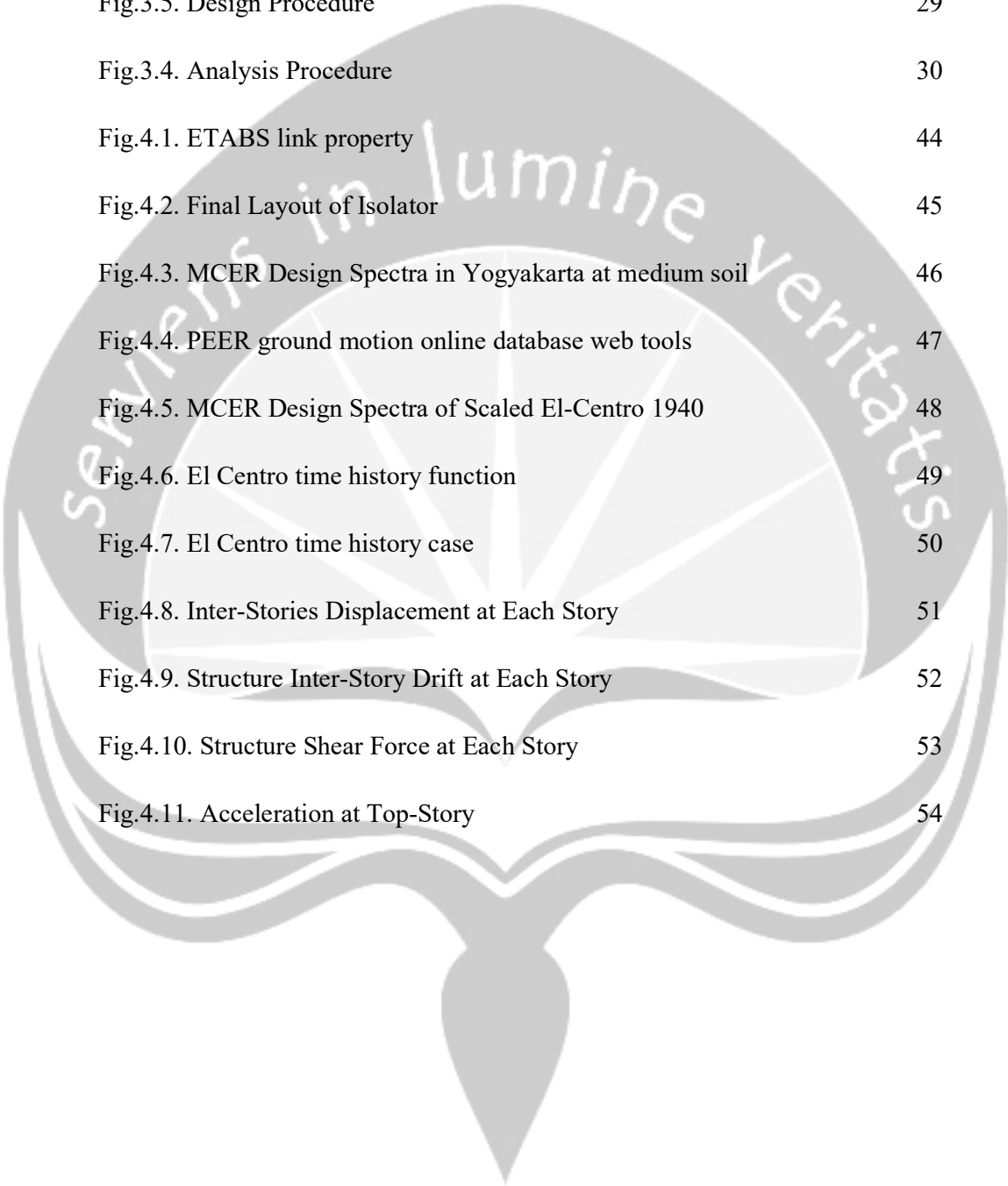


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## ABSTRACT

**EFFECT OF BASE ISOLATOR SYSTEM ON UNIVERSITAS ATMA JAYA YOGYAKARTA'S LIBRARY**, Ricky Priyatmoko, Student Number 121314317, year of 2016, Structural engineering, Civil Engineering International Program, Faculty of Engineering, Universitas Atma Jaya Yogyakarta.

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Indonesia is located on three major tectonic plates, which are Indo-Australia plate, Eurasia plate and Pacific plate. Indonesia is also passed by ring of fire volcanic mountain range. As the result, several area in Indonesia is prone to both volcanic and seismic earthquakes. As example earthquakes that occurred in Yogyakarta in 2006 resulted in major damages. When earthquake occurs, the building resists the force and displacement. When the force or displacement exceed the limits the damage occurs to the building to certain extend. When building is designed to respond elastically with no ductility, it may fail to the ground motion due the force is greater than building strength. On the other hand, if the building designed with ductility, it will be damaged but still able to withstand severe ground motion without failure. Contrary to previous method, base isolation reduces the response of the structure by separate and reducing the ground motion from the earth.

Universitas Atma Jaya Yogyakarta (UAJY) is located in an earthquake prone region. This final project attempts to design the base isolation system and compare the structure's response on UAJY's library building. The method used in the design will be using design procedure proposed by MCEER technical report on Property Modification Factor for Seismic Isolator: Design Guidance for Building, which based on 14 November draft of AISC 7-2016. The system final layout is comprised of 18 Lead Rubber Bearing and 33 Natural Rubber Bearing. The modelling of the structure will be done on ETABS version 9.6 and the dynamic analysis on ETABS was conducted using the El Centro 1940 earthquake time history data. The application of TMD on the structure successfully increase the displacement and reduce story drift, acceleration and the story shear of the structure. Base Isolation Structure achieved a total of 70.9% of increase in total displacement in the structure. The largest displacement occurs on the base floor, which have displaced 21.63 cm from initial point. Therefore, the actual story drift of the structure is decrease by average of 70.4%. The displacement makes the natural period of the structure increased to 2.34 s from 1.007 s. This lead to decrease of acceleration in top-story by 70.3% and decrease of story shear force by average 68.4 %. From the analysis of the data output it can be concluded that the use of base isolation system will have significant impact on response of the structure.

**Key Words:** Base Isolator System, El Centro 1940 earthquake time history, ETABS, LRB, Mass Ratio, MCEER Seismic Isolator Design Guidance, NRB