

THESIS

**PREDICTION OF DYNAMIC PARAMETERS OF STRUCTURES BASED ON  
*OUTPUT-ONLY OPERATIONAL MODAL ANALYSIS USING  
FREQUENCY DOMAIN DECOMPOSITION METHOD***



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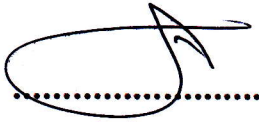


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Yogyakarta, 8 July 2019

RICKY PRIYATMOKO

## FOREWORD

All praise for God for His grace and blessing that the author able to finish this thesis. The purpose of this thesis is as one of the requirement for finishing study Program Studi Magister Teknik Sipil Universitas Atmajaya Yogyakarta. During this study the author receive lot of suggestion, advice, and support from lot of people. Therefore the author like to express gratitude to:

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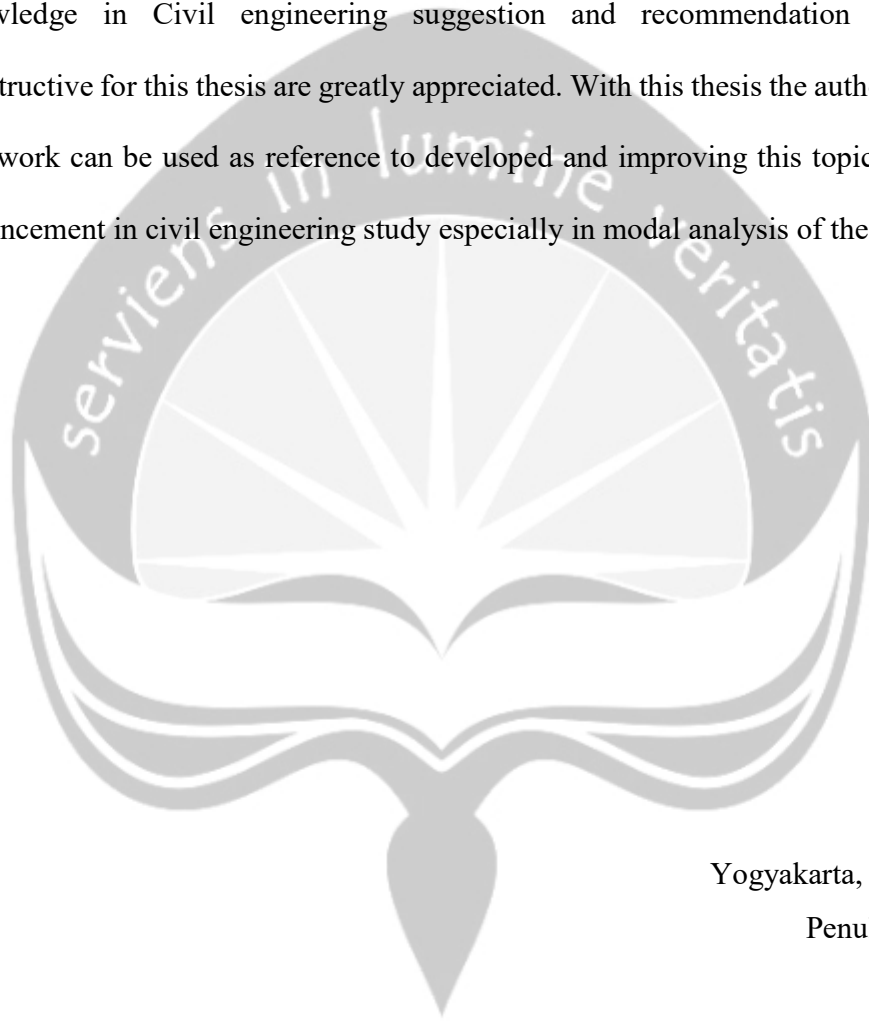
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Yogyakarta, Juli, 2019

Penulis

Ricky Priyatmoko

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## ABSTRACT

Dynamic behavior and system identification are important topic in monitoring and maintaining existing infrastructures. System identification using *Frequency Domain Decomposition* (FDD) is an operational modal analysis (OMA) in frequency domain used on experiment of shear frame model with random vibration.

FDD method is validated by comparing output of FDD data using acceleration input from simulated model with output of FDD using acceleration result of experimental model. The result of acceleration data is recorded using USB accelerometer X16-1D the calibrated and analyzed using *load* to Matlab programs *data\_procces.m* and *solveFDD\_eksperiment.m* to estimate the modal parameter of model structure. Compared with parameter modal of simulation model, FDD method with input simulated acceleration resulted in difference of 1.757% in first frequency and 0.462% in second frequency. Meanwhile for FDD method using acceleration of experimental model, resulted in difference of 6.3126% in first frequency and 7.7327% in second frequency. FFD method is fairly accurate in predicting the frequency of structure, but for difference of modeshapes in experimental is very big compared to simulated model therefore it can be concluded that this modal parameter is cannot be detected in experimental model.

**Keyword :** *Frequency Domain Decomposition (FDD), Operational Modal Analysis (OMA), Modal Parameter of Structure, Shear Frame.*