CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Recent interests in the development of performance based codes for design or rehabilitation of building in seismic active areas show that an inelastic procedure commonly referred to as the pushover analysis is a viable method to assess damage vulnerability of buildings. In brief, a pushover analysis is a series of incremental static analyses carried out to develop a capacity curve for the building (Moghadam and Tso, 2000). Based on the capacity curve, a target displacement that the design earthquake will produce on the building is determined. The extent of damage experienced by the building at this target displacement is considered representatively of the damage experienced by the building when subjected to design level ground shaking.

This approach has been developed by many researchers, with minor variation in computation procedure (Fajhar and Fischinger, 1988; Fajhar and Gasperisic, 1996; Qi and Moehle, 1991; Saidii and Sozen, 1981). In most studies, the method was applied to symmetrical structures. Assuming the floors act as rigid diaphragms, the state of damage of the building can be inferred from applying a two dimensional pushover analysis on the building. If all the lateral load resisting elements are similar, one can furthers simplify the problem to perform pushover analyses on the typical element of the building. One limitation is that the method does not account for the three dimensional effect.

This paper extends the pushover analysis to take the three dimensional torsional effect into account. Because of the torsional deformation, floor displacements of the building will consist of both translational and rotational components. The lateral load resisting elements located at the different positions in plan will experience different deformations. Torsional effect can be particularly damaging to elements located at or near the flexible edge of the building where the translational and rotational components of the floor displacement are additive (Moghadam and Tso, 2000). In view of the damage observed in many eccentric buildings in past earthquakes, it is the purpose of the present study to extend the 2D pushover analysis procedure so that the vulnerability of the elements located near the flexible edge of plan eccentric building can be assessed.

In this study, Panti Rapih hospital in Yogyakarta is selected. Panti Rapih hospital Yogyakarta is a 7 stories concrete shear wall building. And the structure designed by P.T. ATELIER ENAM STRUCTURE.

1.2 PROBLEM STATEMENT

According to the condition above, the problem statement for this final project is analyzing the seismic capacity of Panti Rapih hospital using static nonlinear pushover analysis.

1.3. PROBLEM LIMITATION

In order to simplify the problems, some limitations have stated in this study. The limitations are as follows:

1. The structure of the building is based on the construction drawing of Panti Rapih Hospital building, which design by PT. ATELIER ENAM STRUKTUR and PT. ATELIER ENAM PROFESSIO.
2. This analysis is based on static pushover analysis method.
3. The strength of the beams and columns in the frame allocated following the "strong column-weak beam" capacity design procedure.
4. To design the pushover or capacity curves, ETABS nonlinear version 7.2 is used to analyze.
5. Live load and Dead load are analyzed based on the static equivalent analysis.
6. The specification for analysis and design are based on SK SNI T-15-1991-03 Departement Pekerjaan Umum dan Peraturan Beton Bertulang Indonesia 1971.
7. The 3D analysis is used by the writer to analyze the structure.
8. This analysis is only study the behavior of the plastic hinges which are act on the based columns.

1.4. OBJECTIVES

1 To know the seismic capacity of the building by using static nonlinear pushover analysis.

2 To validate the calculation analysis from method of static nonlinear pushover analysis by using ETABS nonlinear version 7.20.