CHAPTER I
INTRODUCTION

A. Background

Surakarta city is located on the southern island of Java, Central Java Province, Indonesia. Surakarta has many public facilities such as universities, mall, terminals, airport and etc. Need a lot of parking area to accommodate all the passenger or private transport driver to take their vehicles.

The concept of vertical parking building is the main solution to overcome the limitations of land by using air space above. The design of parking building structure will be planned using Special Moment Frame (SMF) as the main structure that restrain gravity and lateral load. It is because the system can develop plastic hinge to resist seismic load and the connection reduction beam section are choosen in system because the connection reduction beam can develop the plastic hinge away from column face and the reduction beam section is preferred connection in Special moment frame.

Planning structure in the final project building planning to use the Indonesia National Standard as *Spesifikasi untuk Bangunan Gedung Baja Struktural* (SNI 1729-2015), *Beban Minimum untuk Perancangan Bangunan Gedung Dan Struktur Lain* (SNI 1727-2013), *Persyaratan Beton Struktural untuk Bangunan Gedung* (SNI 2847-2013), *Tata Cara Perencanaan Ketahanan Gempa untuk Struktur Gedung dan Non-Gedung* (SNI 1726-2012) *a*nd *Sambungan Terprakualifikasi untuk Rangka Momen Khusus dan Menengah Baja pada Aplikasi Seismik* (SNI 7972-2013).

B. Discussion of the Problem

According to background above, the discussion problems that can be taken is how to design parking building with steel construction which can resist seismic load and how to analysis the structure of building with SMF that efficient in accordance with the latest Indonesia National Standard.

C. Objectives and Benefits Planning

1. Planning Objectives

   Building structure design of parking building five stories using Special Moment Frame (SMF) in Surakarta have purpose to get the design planning structure of parking buildings which is safe and could resist to earthquake that often happens in Indonesia based on the regulation apply in Indonesia.

2. Planning Benefits

   Benefit obtained of the final project is to increase the knowledge in the planning of structure, especially in the calculation of steel moment frame and is expected to be used as a reference to the system of calculation of earthquake resistant structures in a building.

D. Limitation Problem

In the preparation of this final project building structure design of the parking building using Special Moment Resisting Frame (SMF) in Surakarta, the problem is limited to the scope of the planning of the structure to prevent the expansion of the discussion, then in this final project is given the limitations calculation and discussion in the final project as follows:

1. The building is parking building five stories plus roof with steel construction in Surakarta.
2. The calculation for steel (roof, ramps, deck composite, column, beam, connection and stairs) and for concrete structure (driven pile and pile cap).
3. This final project only calculation the main structure not include sheet pile and slab on the ground.
4. High of column $1^{st} – 5^{h}$ story is 4 m.
5. Floor use deck composite with reinforced concrete.
6. Driven pile use in the design with use soil properties in site.
7. No review in terms of economic analysis, architectural, and construction management.
8. Reviewing the implementation of the method is only related to the calculation of structures only.
9. Standard use in the design in this final project as follows:

9a) Specification for Structural Steel Buildings (SNI 1729-2015, *Spesifikasi untuk Bangunan Gedung Baja Struktural).*

9b) Minimum Design Loads for Buildings and Other Structures (SNI 1727-2013, *Beban Minimum untuk Perancangan Bangunan Gedung Dan Struktur Lain).*

9c) Seismic Provisions for Structural Steel Buildings (SNI 1726-2015, *Tata Cara Perencanaan Ketahanan Gempa untuk Struktur Gedung dan Non-Gedung).*

9d) *Sambungan Terprakualifikasi untuk Rangka Momen Khusus dan Menengah Baja pada Aplikasi Seismik* (SNI 7972-2013)

9e) Concrete Structural Requirement (SNI 2847-2013, *Persyaratan Beton Struktural untuk Bangunan Gedung).*

10. Structural Analysis for building use software ETABS 2015.