CHAPTER I
INTRODUCTION

Due to an amount of oil remained in the reservoir after primary and secondary oil production, many techniques are applied in order to extract more oil from the reservoir. These techniques are known as enhanced oil recovery (EOR) or tertiary recovery. Primary recovery is the oil production by natural energy of the reservoirs and it can recover up to 30 % of original oil in place (OOIP). Secondary recovery is archived by water flooding which can recover around 25-40 % of OOIP after primary recovery. To improve the amount of oil recovery, tertiary recovery is applied using several techniques such as gas injection, chemical flooding and so on. This stage can recover another 5-20 % of OOIP after primary and secondary recovery.

Gas injection is mostly used in the oil recovery. Because it can reduce oil viscosity and improve mobility. However, this technique can lead to various problems, for example, gas breakthrough and gravity override. To overcome these problems, many methods are applied including chemical injection. One of the chemicals used is surfactant. Because it can reduce interfacial tension and help mobilizing oil. Many researches have studied on foam generated by surfactants (Saputra *et al.*, 2013; Andrianov *et al.*, 2012; Vikingstad *et al.*, 2005) because foam can improve the oil recovery by controlling gas mobility and increasing the sweep efficiency (Farajzadeh *et al.*, 2008). However, the performance of surfactants will depend on many factors, for examples, reservoir conditions, type of surfactants and type of formations. If surfactants are lost in the rock formations, they will affect the foam generation in reservoirs. To find suitable surfactants that are balanced between cost and performance is a challenge and needed to be studied.

Foam stability is an important factor to improve the amount of oil recovery. Foams must stay in the reservoirs as long as possible and tolerate the condition and type of reservoirs after foam generation. Thus, type and amount of surfactants are significant to study to find the optimal amount of surfactants to generate strong foams in the reservoirs.

The purpose of this work is to study the longevity of foam generated from different surfactant system structures and concentrations. The anionic IOS surfactants series and alcohol ethoxylate surfactant were selected to evaluate. The effect of three different alkanes and high brine concentration (represent severe condition) were also investigated. To improve foam stability, co-solvent (dodecanol) and co-surfactant (nonionic surfactant) were introduced to enhance foam stability. Two approaches of foam stability measurement were performed. The first approach was shaking method; and the second approach was purging gas through the glass column. The height of foam was measured as a function of time. A good surfactant was evaluated by its ability to generate good foam that stay for a long period of time.